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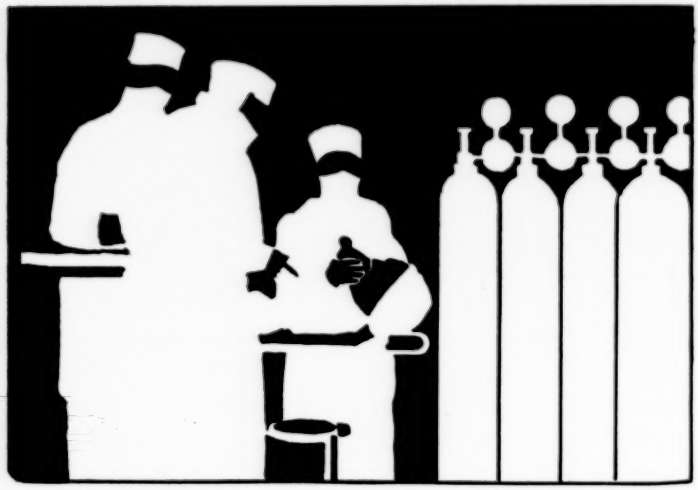
THE NATIONAL ASSOCIATION OF NURSE ANESTHETISTS



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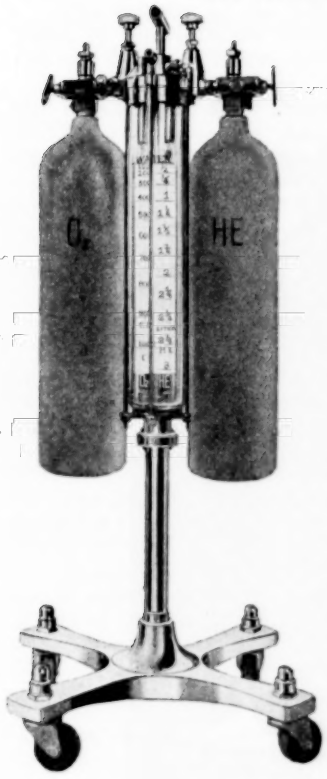

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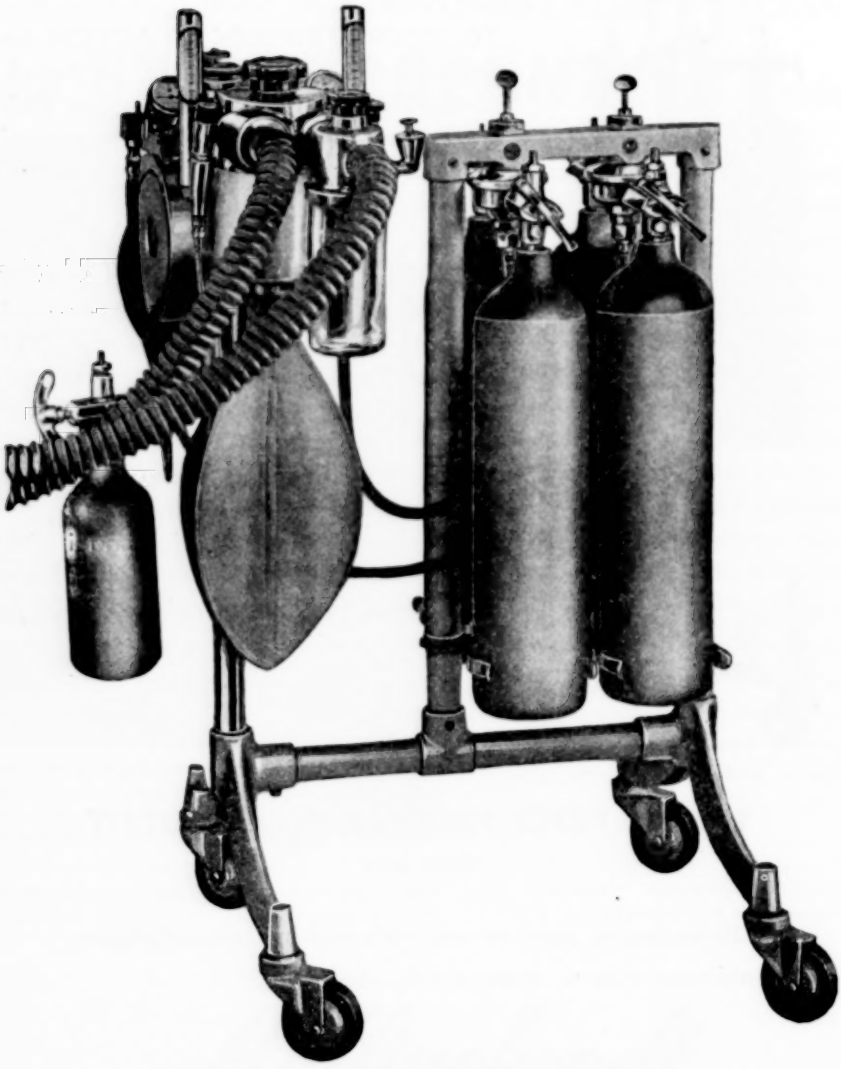

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CARE OF THE PATIENT UNDER SPINAL ANESTHESIA DURING THE OPERATION

HOWARD DU PUY, M.D.*

Baylor University Hospital, Dallas, Texas

There is general agreement that the death rate from spinal anesthesia over the nation as a whole is definitely higher than from general anesthesia. Also it is well known that the death rate from spinal anesthesia is no higher than from general in many outstanding hospitals and clinics, where spinal anesthesia is given proper consideration and where a rigid technique is followed. Not the least of the factors making for added safety in spinal anesthesia is the full realization of the fact that a trained anesthetist is necessary for the care of these patients during the whole course of the operation just as for patients under general anesthesia.

Advantages of Experience

The most favorable results with spinal anesthesia are reported from clinics in which the trained anesthetist who has had wide experience with cases of spinal anesthesia follows his patient all the way through, from the physical examination to the end of the operation. He prescribes the preoperative medication, administers the anesthetic agent, remains in close attendance on the patient until the end of the operation, and often takes part in the postoperative treatment. This has the big advantage of fastening the whole responsibility for the anesthesia squarely on one individual, and gets away from certain errors that will creep in with divided responsibility.

A very good arrangement, and one which is more frequently found, is the one in which the surgeon, or an experienced assistant, administers the spinal anesthetic, while a trained anesthetist gives her undivided attention to the patient during the operation, just as she would to any patient under general anesthesia. She watches closely for changes in the patient's condition, and deals with them intelligently as they occur. Even when trouble is not encountered, the patient is helped through a trying ordeal, and the surgeon is saved anxiety and possible annoyance, and this makes his work easier.

The setup, seen all too frequently, in which the surgeon or any one of his assistants gives the spinal anesthetic and proceeds with the operation, leaving only an untrained person, often the circulating nurse, at the head of the table, of course invites disaster. This is not to say that scores of patients in a series may not come through the operation without careful watching by an anesthetist; however, in the occasional case in which serious trouble develops, only prompt and accurate measures will prevent a fatality. The important point is that the patient under spinal anesthesia deserves the same degree of care that is always given the one under general anesthesia. Otherwise, in some instances catastrophe will follow, and the blame will be placed on the method instead of where it belongs, namely, on neglect (Woodbridge).

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* Read at the sixth annual meeting of the National Association of Nurse Anesthetists, held in Dallas, Texas, September 26-30, 1938.

Dangers to be Avoided

What are the actual dangers which are to be guarded against in this form of anesthesia?

The two principal dangers are:

1. Severe falls in blood pressure,
2. Serious respiratory depression.

A third important factor is that the conscious patient must be closely attended to secure his cooperation, and the unconscious patient must be guarded against anoxemia as well as serious depression.

The first of these dangers, the fall in blood pressure, is produced by flaccid paralysis of the skeletal muscles in the zone blocked by the anesthetic, and also by the interruption of vasomotor impulses to the blood vessels in that area. This drop in pressure can usually be prevented by the prophylactic use of ephedrin in the proper dose previous to the institution of spinal anesthesia, and by not exceeding the safe dose of the anesthetic agent for the individual case. Ephedrin has a prolonged vasoconstrictor action and can very largely prevent the drop in blood pressure. However, it is much more effective as a preventive than as a corrective measure after the pressure has fallen.

The second danger, paralysis of the respiratory center, likewise results from more than one factor. The spinal block may rarely extend high enough to paralyze the thoracic muscles and finally the diaphragm itself. Before the anesthesia reaches this extreme height, there will be a beginning failure of the respiratory center produced by anoxemia from the fall in blood pressure. Low blood pressure allows an insufficient amount of blood to flow through the centers in the medulla. If this scant blood supply is not well oxygenated, the respiratory center gradually fails. This failing respiration can usually be overcome by oxygen inhalations given with the gas machine. Judgment and skill in the care of these patients come with experience and close attention to the patient's needs, just as in general anesthesia.

Equipment Necessary

Certain items of equipment are essential for the proper care of these patients: The gas machine with oxygen is the most important aid when emergencies occur. Cyclopropane should be available in case general anesthesia is needed. Blood pressure apparatus, crushed ice, towels, sterile hypodermic syringe, and ampoules of ephedrin and adrenalin should also be available. There must be an intravenous setup in the operating room.

Use of Pressor Drugs

Mention has been made of the prolonged vasoconstrictor action of ephedrin. It is frequently used in doses of 25 or 50 milligrams, hypodermatically to support the blood pressure, or to raise it before the spinal anesthetic is given. Ephedrin is slow in producing its effect, often requiring fifteen minutes or more, and it cannot be depended upon in the presence of very low pressure associated with anoxemia. When such a situation exists, ephedrin may even hasten complete cardiovascular collapse. Therefore, when ephedrin is given for these conditions it is imperative that inhalations of oxygen be given also to assure oxygenation of the respiratory and circulatory centers in the medulla, as well as of the heart muscle itself.

Quicker acting drugs for correcting drops in blood pressure are adrenalin, 1:1000 solution, and neosynephrin which is supplied in 1 per cent solution. Either of these may be given hypodermatically in doses of 2 or 3 minims along with inhalations of oxy-

gen and with the patient in the head-down position. The dose can be repeated in ten minutes if indicated. The effect is usually noted in one to two minutes after administration of the drug. When these drugs are run into the vein with an intravenous infusion, as 5 per cent glucose in saline, the effect is usually instantaneous.

Close Watching Essential

The anesthetist's care of the patient under spinal anesthesia may be discussed under two heads:

1. Intelligent nursing care.
2. Urgent measures to guard against disaster.

Under ordinary care there is the studying of the patient's chart and making his acquaintance before he comes to the operating room. The anesthetist greets him when he arrives and tells him what will be expected of him. She gives reassuring answers to his questions, allaying fear and securing cooperation. The blood pressure is taken and the surgeon advised of any deviation from previous readings, so that ephedrin may be given if indicated.

The patient is placed in position on the table ready for the injection of the anesthetic. A quiet explanation of the sensations of warmth, tingling and numbness which the patient feels adds much to his comfort. Knowing the anesthetic agent used and the height of anesthesia desired, the anesthetist is able to vary the tilt of the table in accordance with the technique developed for the particular agent used. She knows the difference in the length of time required for some of these agents to become fixed in the nerve structures before deep Trendelenburg position is safe. Using this position too quickly after a heavy solution may bring alarming consequences.

The patient's blood pressure, pulse and respiration are recorded at frequent intervals and the surgeon is advised of any significant changes. By the anesthetist's keeping in close touch with the patient and giving encouragement, his general attitude is much improved. The patient's chest must be protected against the weight of heavy instruments which may be placed on it and the possibility that the surgeon's assistants may lean on it and make breathing difficult.

Keeping cold towels on the head, moistening the lips and giving cracked ice when permissible add greatly to the patient's comfort if he is awake. An occasional whiff of aromatic spirits of ammonia may have a good psychological effect. If nausea appears, a few inhalations of oxygen from the machine usually give prompt relief. If in spite of this vomiting takes place, the anesthetist assures the patient it is nothing serious and that it occasionally occurs in these operations.

Nothing is said to the patient about the possibility of pain. In testing the height of anesthesia, the skin is pinched with an Allis forceps and the patient's face is observed for evidence of pain. He is not told when the operation begins, but is assured it will not disturb him when it does.

Observing the patient's general appearance is very important. Careful watch is kept to see if the skin is warm, dry and of a good color, and to note the presence of perspiration or cyanosis. The facial expression helps the anesthetist to foresee nausea and approaching shock, as well as lack of oxygen.

Urgent Measures

Under urgent measures are included:

1. Treatment of drops in blood pressure

2. Treatment of respiratory depression

3. The timely institution of general anesthesia if it becomes necessary.

During the first quarter of an hour it is not unusual to get a drop of 15 or 20 millimeters of mercury in the systolic pressure. However, this is usually prevented by the prophylactic use of ephedrin as already mentioned. Its effect is prolonged, usually lasting from forty-five minutes to an hour or more. After twenty minutes any fall in blood pressure usually may be charged to surgical manipulations, traction on the mesentery, or loss of blood, these being the usual factors which tend to produce shock.

Value of Oxygen

Slight drops in blood pressure are often corrected by inhalation of oxygen. When this is not effective, the patient's head may be dropped a few degrees and two minims of 1:1000 adrenalin solution given by hypodermic. This dose may be repeated in ten minutes if required. The oxygen inhalations are continued after this medication is given. The integrity of the medullary center and the heart muscle depend on adequate oxygenation being maintained. Anoxemia brings progressive loss of vascular tone with a fall in blood pressure if it persists.

Support of Circulation

If in spite of lowering the head and giving oxygen and adrenalin, the pressure continues to drop and approaches the critical level, an intravenous infusion, such as 5 per cent glucose in saline, must be started without delay. Also, preparation for a transfusion should be promptly made if the patient's condition fails to show immediate improvement. Citrated blood can be given easily following the glucose solution and through the same tubing, making it unnecessary to interrupt the operation.

When death occurs under spinal anesthesia, it is practically always from respiratory paralysis. It has been clearly demonstrated that artificial respiration will insure recovery in many instances, even after complete paralysis of the respiration has taken place.

It is the anesthetists's duty to watch for depression of the respiration, and when in doubt as to the respiratory exchange, it is always correct to give inhalations of oxygen and watch the excursion of the breathing bag to check the amount of exchange present. When respirations are inadequate, they can be increased by slight pressure on the bag with each feeble inspiratory effort the patient makes. In such a case a helium-oxygen mixture can be breathed more easily than the heavier gas-oxygen alone. A satisfactory mixture for this purpose is 70 per cent helium and 30 per cent oxygen.

Respiratory Failure

The following definite signs which precede respiratory paralysis must be watched for:

1. Disappearance of thoracic respiratory effort

2. Increasingly diaphragmatic type of breathing

3. Loss of spoken voice

4. Dilatation of the alae of the nose and use of the accessory muscles of respiration, causing

5. Dropping of the jaw on inspiration.

When these signs are seen, the head of the table is lowered immediately to guard against cerebral anemia, and inhalations of oxygen are started at once. Artificial respiration is given if the respiratory effort is too feeble. If this must be carried on for some time, an intratracheal tube makes the proced-

ure more certain and much easier. Lives have been saved in this way.

Supplementary Anesthesia

By the careful calculation of the patient's resistance and the probable length of the operation, it is usually possible to administer the correct dose of the spinal anesthetic agent to last the required length of time for the completion of the operation. In addition to novocain, there are now the longer acting drugs, metycain, pontocain, and nupercain, which permit spinal anesthesia lasting from half an hour up to as much as four or five hours, with safety in expert hands. Knowing the patient's physical condition and the anesthetic agent used, the anesthetist is able to predict the approximate time the spinal block will disappear. This enables her to be prepared to induce general anesthesia promptly without any interruption of the operation.

There are other situations in which general anesthesia may be demanded at a moment's notice. One is in the case of the very apprehensive patient who becomes panic stricken and is unable to cooperate with the surgeon. Even with the greatest care in premedication this sometimes happens, and the patient must be put to sleep before the operation can be continued. Again, it occasionally happens that nausea and retching are not controlled by oxygen inhalations or any of the other remedies usually applied, and become so troublesome that general anesthesia offers the only hope of completing the operation successfully.

Advantages of Cyclopropane

The recent introduction of cyclopropane has brought for the first time a satisfactory means of controlling retching during spinal anesthesia. Its administration stops the retching, brings welcome unconsciousness to a weary patient, and supplies beneficial high proportions of oxygen, needed so much at this time. It also has the great advantage of not increasing abdominal respiratory movements. The addition of general anesthesia to spinal anesthesia brings a distinct responsibility, and should always be done slowly and with great caution to avoid respiratory and circulatory depression. This danger is much less with cyclopropane than with nitrous oxide and ether.

In nitrous oxide-oxygen or ethylene-oxygen anesthesia, a degree of anoxemia is necessary which is not safe for the average patient under spinal anesthesia.

Conclusions

1. The patient under spinal anesthesia deserves the same degree of care that is always given to the patient under general anesthesia.

2. When there is persistent nausea, or failure to cooperate, or inadequate spinal anesthesia, the patient should have the benefit of a general anesthetic without delay.

3. Severe depression of circulation and respiration call for oxygen inhalations along with adequate treatment to combat shock.

4. In the event of respiratory paralysis, artificial respiration with oxygen offers the best chance to save life.

NOTICE

An open competitive examination for anesthetists will be held some time after the first of the year by the Department of Civil Service, Albany, N. Y. For further information write Istar A. Haupt, Associate Examiner, Department of Civil Service, Albany, N. Y.

ANALGESIA IN OBSTETRICS

ROY L. GROGAN, M.D., F.A.C.S.*

Fort Worth, Texas

Analgesia means simply absence of sensibility to pain. The term "obstetrical analgesia" was coined by James T. Gwathmey and first used as the title of a paper read before the New York Obstetrical Society December 9, 1924. Since that time it has been accepted generally as defining the state or condition of the patient in which she is not aware of pain, but is sufficiently conscious to obey commands, and to some degree make her wishes known more or less intelligently.

A term used frequently in conjunction with the term analgesia is amnesia, which merely implies "forgetfulness." The essayist feels that it should not be used to describe an obstetrical condition, but that the appellation should be made to the condition of the attendant who did not remember to relieve the suffering woman's pains.

There is a very narrow margin of differentiation between analgesia and anesthesia in obstetrics; the degree is different owing to the susceptibility of each patient to the drug used, the amount employed, and the method of administration. It would, therefore, seem best to use the term anesthesia of either obstetrical or surgical degree in such discussions as this. If there is any encroachment upon the dissertations on "obstetrical anesthesia," apologies are offered in advance. Amnesia in obstetrics will not be discussed.

Psychotherapy, which was used as far back as 3600 B.C., was the chief therapeutic measure employed for many centuries. Recently science has put such practice on a firm basis, but since its value has had slow recognition, the cultist and the quacks are many laps ahead in its use.

Hypnotism has been used for centuries as a means of alleviating the pain of childbirth. It is reported that Apollo was delivered while his mother was in a hypnotic state. Schultze-Rhonoff, early in the nineteenth century, advised beginning its use as early as the seventh month of pregnancy. Although hypnotism is not advised, much can be done to allay the patient's fear of pain by suggestion, aided by medicines to allay the agony of childbirth.

It may be supposed that the prehistoric woman suffered relatively little during labor, perhaps no more than the females of other species which roamed the face of the earth, but the voice of today tells that there is agonizing pain of greater or less degree due to contraction of the uterus and the stretching and tearing of tissue. Every known mechanical device is being used today to allow more ease, comfort of living and time for intellectual pursuits, while improper indulgences — physical and mental — with the ravages of disease, have fitted women less and less for childbearing. There remains only an occasional one who believes the biblical teaching that one must have pain in labor. The press of today, with the exception of an occasional voice in the wilderness, is advocating that more attention be paid the expectant mother, more with reference to alleviating the

* Read at the sixth annual meeting of the National Association of Nurse Anesthetists, held in Dallas, Texas, September 26-30, 1938.

pains of childbearing than to the prevention of accidents of labor. It must be admitted that there is a slight rise in the preventable mortality rate of mothers. It is to be hoped that this statistical finding is the result of more accurate compilation of records and not the result of faulty technique of delivery or administration of drugs to allay the pain of labor. It is not reasonable to believe that with improved teaching methods in medical colleges and a greater public demand for more intensive care during the prenatal period, labor and puerperium, physicians could be guilty of this accusation. As to the effect of analgesics upon the child, Drabkin, Shute, Davis, McCallum, Clifford, and Irving have shown the effects of drugs administered during labor to be greatly exaggerated and to depend largely upon the relation of the time of administration to the time of delivery, and it is the consensus that more generally prolonged cyanosis, fetal death, et cetera, are the results of trauma during labor or pressure on the umbilical cord.

In ancient times narcotic potions were given women in labor. It was current practice to give the parturient woman large quantities of alcoholic beverages at the beginning of labor with the hope that the child would be born while the mother was in a drunken stupor. The records of the early Egyptians tell of the use of opium. Fumes of opium, hemlock, hyoscyamus, mand.agora, ivy, lettuce, hemp, and dock seed were released in an air-tight chamber within which the woman to be confined was placed. If she were overcome, fumes from vinegar were used to awaken her (Meeker). In India coal vapor has long been used as an analgesic in childbirth. In the early nineteenth century there followed in rapid succession the use of chloroform, ether, and nitrous oxide, with storms of protest from both laity and clergymen.

To Crawford W. Long of Jefferson, Georgia, belongs the distinction of having first used ether in obstetrics. On December 27, 1845, he delivered his wife, and from his description of the amount used and the patient's reaction, it is rational to believe that only an obstetrical degree of anesthesia was obtained. On January 19, 1847, Sir James Simpson began the use of ether in obstetrics but soon substituted chloroform because his patients objected to the smell of ether on his clothes. This type of analgesia soon was popularized after Queen Victoria on two occasions, in 1853 and 1857, had been delivered under its influence. Nitrous oxide and oxygen in 1880 began to be used in obstetrics after having been used by E. Andrews of Chicago in surgery for more than twelve years. In 1922 Luckhardt introduced ethylene, and it has proved the most valuable of all the inhalation methods of analgesia; all had the common fault of being used so late in the course of labor that many hours of excruciating pain had to be endured by the patient.

Earliest of the present day methods of analgesia was the use of scopolamine and morphine, introduced first by Schneiderlain in 1902 and Steinbuchel in 1903. Kronig and Gauss in 1906 reported five hundred cases and thus gave obstetricians the greatest subject of controversy since the introduction of forceps by Chamberlen in 1580. With some modification this method is still in vogue. In the hands of a well trained attendant and substituting one of the less toxic opiates, such as dilaudid, which is not repeated, there seems to be no great objection to this procedure. A small amount of ether, or preferably ethylene and oxygen, should be used

as a terminal anesthetic. If nitrous oxide and oxygen are used, care must be exercised not to use a stronger concentration than 85 per cent nitrous oxide and 15 per cent oxygen, turning off the nitrous oxide after the head has crossed the perineum and turning in pure oxygen to raise the oxygen content of the fetal circulation.

For many years following the advent of the so-called twilight sleep there was a parade of methods with varying successes. Of spinal, sacral, and local infiltration Arthur Hertzler remarks: "Many of the current writings bear very obviously the mark of having undergone a new experience which they are anxious to proclaim to the world. It reminds one of the young swain who first kisses his sweetheart in the moonlight. He thinks he has discovered something new and wholly new. He has and he hasn't, it depends on the point of view." Though not new they deservedly have a definite place in the field of obstetrics.

Dr. J. T. Gwathmey at the New York Lying-In Hospital developed a method of analgesia to which he gave the name synergistic because it combined the analgesic action of several drugs. The original routine called for morphine and magnesium sulphate, with ether, alcohol and quinine suspended in olive oil. Of this method McCormick has said, "In proclaiming the rectal ether method of ameliorating labor pains, Gwathmey presented to the obstetrical world the most valuable contribution since the advent of the Caesarean operation." The method has been used generally and by every one. Many years ago it was deemed advisable to substitute hyoscine for magnesium sulphate which causes marked pain and soreness at the site of injection and certainly does not produce so much analgesia as morphine, or dilaudid and scopolamine. Lately other successful modifications of the method have appeared. It seems quinine has been left out because of the effect on labor pains. Paraldehyde has been added to the rectal instillation. Its action is rapid and the effect quieting. More recently barbiturates have been given orally with morphine sulphate hypodermatically, and these have been followed by a rectal instillation of ether in oil or ether and paraldehyde in oil if the labor is prolonged. Necessarily a terminal anesthetic must be used to prevent marked restlessness on the part of the patient. Only a small amount of nitrous oxide and oxygen, or preferably ethylene and oxygen, is necessary. Open ether may be used if the gases are not available, but owing to the narrow margin of safety chloroform is not advised.

Barbiturates, such as sodium amytal, nembutal, ipral, seconal, and others, made their appearance as analgesic agents about ten years ago. Method upon method has been suggested and volumes have been written. These drugs are administered orally, rectally, or intravenously. Because of the irritation of tissues they are not used subcutaneously or intramuscularly. A brief résumé of a very successful method follows: When the patient, a primipara, enters the hospital or is first seen by the physician and is complaining of pain with the contractions, and if it is determined she is in labor, she is given a cleansing enema. If the contractions are occurring at three to six minute intervals, 3 or 4½ grains of nembutal are given by mouth and $\frac{1}{150}$ grain of hyoscine by hypodermic. The reason for this large initial dose is to get her over the excitement stage quickly. If the patient has had food recently, absorption is slow and she may get very restless. If the progress of labor is

slow and the patient is restless and complaining, 1/6 grain of morphine and 1/300 grain of hyoscine are given by hypodermic and either 1½ or 3 grains of nembutal may be given. This should carry the patient for from four to six hours, at the end of which period frequently she has complete dilatation. If there is not complete dilatation and she becomes very restless and seems to be conscious of her pains, three grains of nembutal may be given by mouth; or if the attendant decides she will not have time to obtain the effect from oral administration it is good practice to give 3¾ grains intravenously, giving not more than one cubic centimeter per minute, at the same time watching the patient's reaction to her pains and the effect upon her reflexes. A terminal anesthetic of nitrous oxide and oxygen of a dilution of 85-15 or 80-20, or ethylene and oxygen 80-20 or 90-10, may be used. A trained attendant must be with the patient constantly, preferably a nurse anesthetist who previously has had experience in obstetric surgery, who can determine if an anesthetic of the non-relaxing type such as the previously mentioned gases or of a more relaxing type, such as the above gases with the addition of ether, is necessary.

A condition occasionally seen with the treatment in primiparae and frequently in multiparae should be mentioned. It is not infrequent to have a patient go into labor and progress so rapidly that quick and drastic measures are demanded. The procedure advisable is to give 4½ or 6 grains of nembutal orally, 1/150 grain of hyoscine may be given by hypodermic, and then an inhalation relaxing or non-relaxing anesthetic given until the barbiturates have had time to take effect. These patients more often than not have food in their stomachs, which delays absorption, and there has been no time to use a cleansing enema. It seems more rational, and has been the practice of the essayist since 1930, to use instead of the inhalation anesthetic, intravenous administration of from 3¾ to 7½ grains of nembutal or 7½ to 15 grains of sodium amytal to complement the medication given orally. As the barbiturates are antispasmodics, the attendant must be watchful. It is not unusual to find a half dilated cervix completely dilated a short time after the intravenous use of barbiturates.

Prophylactic forceps are generally used with episiotomy, mediolateral, or lateral but more usually the median perineotomy. This technique has the distinct advantage of being more aseptic, with it better control of the rapidity of birth may be exercised and there is markedly less pressure on the baby's head. One cubic centimeter of pituitrin is given as soon as the child is delivered and an ampoule of ergotrate intramuscularly after the delivery of the placenta.

No idiosyncrasy to barbiturates by the mother has been observed in more than 2000 administrations. No accidents more serious than bruises and one broken tooth have happened. Only two hemorrhages that proved in the least alarming could be assigned to the drug. Only one maternal death in 2500 cases of private nature occurred, and this was found to result from pulmonary embolus. While the infant mortality rate has been a fraction more than 2 per cent, none of this can be attributed to the analgesics used. Dehydration was combatted by fluids by mouth, hypodermoclysis of normal saline and intravenous infusion of saline and glucose.

The effect of barbiturates, especially when used as analgesics, has been studied comprehensively by Clifford

and Irving of Harvard University School of Medicine, and their conclusion was:

"Opium derivatives administered during labor have been found to exert an unfavorable influence upon the condition of the new-born infant proportional to the amount given and to the time interval between the administration of the drug and the birth of the child.

"The barbiturates have had no harmful effect upon either the life of the fetus or upon the life of the newborn infant."

In conclusion it may be said that every parturient mother deserves relief from the agonizing pains of childbirth. There are many methods of relieving pain but a technique must be suited to each patient, not the patient to a routine procedure. To individualize in administration of analgesics will demand more, not less, of the attendant's time. However, what phase of medicine or surgery is of so great importance, demands more skill, exacts as much, as does that role of the attendants who tenderly, skillfully, and safely, it is hoped, watch by the side of "her who goes down into the valley of the shadow of death that another may live?"

ANESTHESIA IN THORACIC SURGERY

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The basis of good anesthesia in thoracic surgery is a thorough knowledge of the anatomy and physiology of the mechanism of respiration. No other type of anesthesia requires more skill of administration, more keenness of perception, or more alert realization of the physiological possibilities and probabilities than anesthesia in this branch of surgery. With the development of anesthesia the mortality from many surgical procedures in this field has decreased and will continue to do so. Within the past thirty years it has been substantiated that persons may suffer the loss of an entire lung and survive to live a normal life.

Until a comparatively recent date the theory of a fatal outcome following open pneumothorax was universally accepted. Contrary to this antiquated belief, we now know life and health to be compatible with total or partial pneumonectomy, the entire unilateral removal of ribs, and other heretofore seemingly impossible operations.

A practical application of physiological knowledge has been directly responsible for the technical development of anesthesia for these cases. Operations which were formerly deemed impossible are now successfully accomplished.

Physiology

A knowledge of the anatomy and physiology of the thoracic organs is indispensable for intelligent anesthesia in thoracic surgery. Adequate discussion of these fundamental subjects, however, cannot be included in a short paper.

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Development

Since the negative pressure within the pleural cavity is immediately altered by the atmospheric pressure of an open pneumothorax, success in intrapleural surgery has been dependent on the development of an anesthesia technique capable of counteracting this alteration. Open pneumothorax may be compensated for in one of two ways, either by decreasing the air pressure over the surface of the lung from without, or by increasing the intrapulmonic pressure from within. Two types of apparatus, working on diametrically opposite principles, were devised to accomplish the desired result.

Sauerbruch,[1] Mikulicz' assistant, devoted his entire time to the problems of this field and was able to demonstrate the feasibility of the first so-called negative pressure chamber in 1904. The patient's body, the surgeon, and his assistants were within this chamber, which was in reality a small operating room, so constructed as to maintain reduced pressure of from –5 to –8 millimeters of mercury. By virtue of this condition an exposed lung remained in normal or approximately normal inflation during whatever procedure the surgeon wished to carry out. I have found no mention in the literature of the effect of the negative pressure on the operating team. The patient was protected from any ill effects by an encasing inflated cushion applied below the waist. Communication with the outside was made by telephone. Anesthesia was probably by the open drop method. This chamber, although complicated, was remarkably successful and is recorded as being the greatest factor, up to that time, in the development and progress of thoracic surgery. Renewed interest, stimulated by the genius of Sauerbruch, inspired the search for a less complicated and less expensive means of procuring the same result.

The positive pressure theory was first applied by Quénu in 1896 by the simple process of utilizing a diver's helmet.[2] When the pleura was entered, accidentally or deliberately, the pressure within the helmet was raised sufficiently to prevent collapse of the lung. Anesthesia was sustained by the expedient of a sponge placed inside the chamber, saturated from time to time with the anesthetic agent. Tuffier took the next step and introduced the less complicated insufflation technique.[2] It is interesting to note that fifty years before the introduction of the Sauerbruch cabinet, physiologists were well aware of this method,[3] having used it experimentally on animals. They and their method were ignored, however, on the assumption that air, or gases, blown directly into the lungs had an injurious effect on the tissue. Tuffier's technique employed a copper tube introduced into the larynx or trachea. Air passing over ether was delivered through this tube, under sufficient pressure to prevent lung collapse. Matas, of New Orleans,[1] ignoring the accepted belief that to enter the thorax invariably produced a fatal result, first applied the insufflation theory for the successful removal of a large sarcoma of the chest wall in 1896.[2]

The advent of nitrous oxide brought with it the tightly fitting face mask, equipped with a spring exhalation valve adjusted to blow off when the desired pressure had been reached. The great drawback to this method was the difficulty of proper application and the inaccessibility of the nose and mouth, which prohibited efficient elimination of the abnormal secretions and mucopurulent matter of thoracic pathological conditions.

Another great milestone, intratrach-

eal insufflation, was reached by Meltzer and Auer in 1910.[4] A small tube, two-thirds the diameter of the trachea, was introduced almost to the bifurcation, and by means of a foot-bellows air mixed with ether was blown almost continuously through the tube. Intrapulmonic pressure was then accurately controlled, excess air escaping around the catheter. Later the foot-bellows was replaced by a small electric motor.

There has been considerable difference of opinion in regard to the relative value of intratracheal and intrapharyngeal insufflation. Unquestionably intratracheal insufflation gave great impetus to thoracic surgery because many of the previous problems of anesthesia were solved by it. Positive pressure, however, is always accompanied by certain dangers and this is particularly true of intratracheal insufflation. For instance, prolonged intrapulmonary pressure exerts considerable influence on both the lungs and the circulation.[2] It tends to weaken muscle tone. Postoperative apnea is not infrequent. If excessive intrapulmonary pressure is maintained, the pressure may be great enough to retard the flow of blood into the heart, thus putting additional strain on that already overtaxed organ. Another bad feature of this method is that air under pressure is distributed equally into both bronchi, thus distending the operated lung as well as the healthy one. This distention seriously impedes the surgeon's already difficult task and is considered one of the greatest disadvantages of intratracheal insufflation. Increased intrapulmonic pressure also prevents the exhalation of carbon dioxide in spite of respiratory movements.

The intratracheal tube, moreover, obstructs two-thirds of the lumen of the trachea. By the insufflation method this tube is filled with air under pressure and acts as a constant obstruction to the exhalation of carbon dioxide, while hyperoxygenation usually results in acapnia. To provide for the satisfactory elimination of excessive carbon dioxide and to permit the lungs to collapse to some extent in order to preserve their tonicity, pressure was interrupted at regular intervals by an assistant anesthetist.

Because of these objections to intratracheal insufflation, intrapharyngeal insufflation has been preferred by some since the foregoing conditions occur less often if the trachea is unobstructed. Intrapharyngeal insufflation depends on a constant volume of air under low pressure being directed into the pharynx. The lung on the operated side soon collapses following the opening of the pleura. The non-operated lung sustains normal physiological functions by its normal respiratory excursions. Only enough pressure is maintained to insure a steady mediastinum.

During our earlier experiences with intrathoracic surgery we felt that the use of an intratracheal catheter eventuated in the possible hazard of infecting the healthy lung. Additional experience has shown that this is not the case, or at least that the slight possibility is far overshadowed by the greater control of the anesthesia. We emphasize the statement that dexterity in intubation is essential. Fatal mediastinitis may result from faulty intubation.

Waters, with his comparatively recent contribution of the closed circle or absorption technique, followed by the tracheal catheter fitted with the balloon cuff, has introduced the apparently ideal technique for intrathoracic anesthesia. Pressures and anesthesia, anoxemia and acapnia, together with

the respirations themselves, are under the complete control of the anesthetist.[5]

We now know that the need for positive pressure has been greatly exaggerated.[6] The anesthesia is efficient, smooth, and uncomplicated, meeting all physiological requirements if the closed circle technique is employed without positive pressure. The intratracheal absorption method has the advantages of providing a ready means of suction; positive pressure may be furnished on demand and artificial respirations are easily instituted if necessary; the atmosphere is moist and warm at all times; carbon dioxide and oxygen exchange is always under the control of the anesthetist; and the surgeon has a quiescent field in which to work and is no longer hampered by the respiratory movements of the operated lung.

The intratracheal technique has been universally accepted as the most efficacious method. On this point all surgeons and anesthetists agree, although there does exist a wide difference of opinion as to the relative merits of the many agents employable.

Successful operations for the partial or total removal of a lung have been reported from time to time during the past thirty years or more, but the progress and development of anesthesia in thoracic surgery now makes it possible for the thoracic surgeon to perform both intrapleural and extrapleural operations with increasing success and with a great reduction in the immediate mortality.

Problems[6]

Upon reflection it is evident that the problems of anesthesia in thoracic surgery as contrasted with those in general surgery differ greatly.

1. The patient is as a rule the "poor risk" type. He has been ill over a long period of time and septic material from his lesion has been absorbed into the system. Secondary anemia is usually present, which together with the diseased condition of the respiratory organ will prohibit any degree of anoxemia.

2. The encroachment of the pathological lesion upon the normal amount of alveolar space has limited the absorption surface, not only for oxygen but for the anesthetic as well.

3. Bronchial secretions are always increased and are ever threatening to spill over into the healthy lung.

4. The cough reflex is extremely active.

5. The position of the patient, usually the semiprone or the lateral, nearly always with the sound lung dependent, decreases further the already reduced vital capacity and inhibits adequate ventilation.

6. Circulatory and respiratory embarrassment are inevitable during and following intrapleural surgery unless preventive measures have been provided.

Taking these facts into consideration, we seek the ideal anesthetic. This should possess the following qualities:

1. It must be non-toxic and non-irritating, free from harmful immediate or delayed after-effects.

2. It should be of sufficient potency to permit the administration of a high percentage of oxygen in order to prevent even a slight degree of anoxemia.

3. The induction period should be devoid of any manifestation of the excitement stage and should be as rapid as is compatible with the comfort and safety of the patient.

4. It is desirable that the agent produce quiet respirations of sufficient amplitude to insure adequate aeration. Labored, jerky respirations tend to spread inflammatory exudates.

5. For obvious reasons, the period of recovery must be short and the cough reflex re-established almost immediately.

6. The agent must provide sufficient depth of anesthesia to allow interruption for aspiration.

7. It must lend itself to the complete control of the anesthetist in the demand of the surgeon for anesthesia as well as for intrapulmonic pressure.

8. It should minimize the loss of body fluids.

9. It is desirable that the agent be non-explosive.

Agents

The pioneers of thoracic surgery were handicapped not only by the inadequacy of application but also by the limited anesthetic agents at their command. The early drugs were ether and chloroform. Today these have been largely replaced by the less irritating and less toxic agents—avertin, nitrous oxide, ethylene and cyclopropane. In many clinics intravenous, local, and spinal anesthesia are preferred for various operations.

A review of the literature emphasizes the fact that no one method or agent has been universally accepted. There have been almost as many as there are thoracic surgeons.

Avertin as a basal anesthetic with any of the gaseous agents establishes a comfortable induction and mitigates postoperative nausea. However, because of its action as a circulatory and respiratory depressant and its accompanying delayed recovery period, we have discontinued its use for thoracic surgery.

The necessity of a high percentage of oxygen for these cases makes *nitrous oxide* difficult of administration without the aid of a supplement in intrapleural operations. It has been very satisfactory, however, for the extrapleural operations.

Ethylene is only slightly less inadquate than nitrous oxide and has the added hazard, especially in the lower concentrations, of explosibility.

Cyclopropane has gained considerable popularity within the last three or four years but is by no means always the anesthesia of choice. Induction and recovery are unbelievably rapid, and relaxation is adequate for dexterous intubation. Its great advantage in these cases is its ability of administration with high percentages of oxygen. This exceeds its disadvantage of high explosibility, prohibiting the use of the cautery.

While *ether* gives perfect anesthesia, it is mildly toxic and is irritating to the mucous membrane and lung tissue.

We have had no experience with intravenous or spinal anesthesia in these cases and have employed local anesthesia for only the minor procedures.

Methods

In March 1933, Graham reported what he believed to be the first total pneumonectomy for carcinoma of the left lung.[7] This operation was done under avertin-nitrous oxide intratracheal anesthesia. This patient is alive and leading a normal life.

The same year Rienhoff reported two cases of total left pneumonectomy for tumors of the bronchus,[8] a few centimeters below the bifurcation. These two patients were operated upon under avertin-nitrous oxide-ether anesthesia without intubation. One of these patients is well and active today and last year survived a postoperative pneumonia of the remaining lung following a cesarean section. The other, a child of three, was well and very active until, unfortunately, she was

drowned during the summer of 1937 (four years postoperatively).

Coryllos and Bass report the routine use of evipal for thoracoplasties, with no fatalities attributable to the anesthesia.[9] They feel that the exceptionally smooth postoperative course following this type of anesthesia is one of its great advantages. The patient is in full possession of his cough reflex and able to expectorate immediately after operation. Intubation is carried out before anesthesia is begun if the sputum exceeds 20 cc. in twenty-four hours.

Shields advocates the use of spinal anesthesia for low lobectomies and thoracoplasties.[10] Bourne has recently reported a series of three-stage thoracoplasties,[11] all done under spinal anesthesia, in which the Etherington-Wilson technique was used with gratifying results.[12]

Two years ago Rovenstine reported the endobronchial technique.[5] At the time of his report his "personal clinical experience was limited," but from the results thus far obtained he felt that "the technique at least indicates a line of experimental investigations that may develop an anesthetic support for thoracic surgery sufficient for the present and ever increasing demand."

The anesthesia or the method of choice, then, cannot be any one agent or any one method. They must be the agent and the technique which give individual surgeons and anesthetists the best results. Furthermore, this branch of science, like all others, is rapidly growing, and we must not be content with any single method.

Preoperative Preparation and Preliminary Medication

Patients about to undergo extrapleural surgery need no particular preoperative preparation. They should, however, have care commensurate with their general condition.

Patients to be subjected to total or partial pneumonectomy must be specifically treated in anticipation of the intrathoracic manipulation. It has been our experience that to treat these patients with preliminary pneumothorax, repeated until desired collapse has been accomplished, has diminished much of the shock of operation. These patients are prepared by gradual lung collapse. Over and above its value as a shock preventive, this technique has the additional advantage of enabling the patient to adjust himself gradually to reduced aeration, and insures an immobile mediastinum. It also gives the surgeon and the anesthetist an idea of the patient's ability to withstand intrathoracic interference. The course of preliminary preparation just outlined extends over a period of from ten days to three weeks.

Satisfactory collapse is not always possible because of the existence of adhesions resulting from inflammatory processes. In that case the surgeon has been forewarned, and a two-stage or even three-stage operation is indicated. Severe shock is frequently the concomitant of the release of parietal pleural adhesions.

In addition an intrathoracic injection of 50 cc. of beef culture broth is given our patients twenty-four hours before operation, although this treatment has no direct bearing on the anesthesia. The purpose of the injection is to create an inflammation of the pleura, thus raising the leucocyte count in anticipation of the almost certain postoperative infection.

Patients suffering from bronchiectasis should always have complete postural drainage an hour before the anesthesia is started.

Just as the anesthetic is selected with

the utmost care, so also is the accompanying preliminary medication. A wide variety of drugs is in general use today. The essential points to be kept in mind in the selection of this medication are, first, that the already taxed respiratory system must be spared further embarrassment; secondly, certain drugs blend better with certain anesthetic agents; and thirdly, the patient's susceptibility to the drug should be ascertained.

Morphine and atropine have been our customary preliminary medication. Atropine or scopolamine relieves the excessive secretions induced by most anesthetics, and though the morphine may be omitted, atropine or scopolamine never is. Avertin as a basal anesthetic precludes the use of morphine because of its action as a respiratory depressant. Nembutal, administered in conservative doses, one-half the total dosage being given the preceding night and the other half one to two hours before operation, has supplanted avertin on the thoracic service. Those patients to be anesthetized with cyclopropane have received this sedation as well as morphine and atropine one-half hour before operation. This has not appeared to be too much medication, and the results obtained seem to warrant their use.

No matter what the drug or combination of drugs used, the dosage must be individualized. It is stupid to forget that human beings, like other animals, differ greatly in the degree and character of their response to drugs.

Thoracic Operations[2]

Thoracic surgery includes operations for empyema, acute or chronic; bronchiectasis; abscess of the lung; tumors of the lung, pleura, mediastinum, or chest wall; tuberculosis; asthma; wounds or injuries to the lungs; tumors and diverticula of the esophagus; pericardial adhesions; and cardiac injuries.

Operations for acute empyema are done satisfactorily under local anesthesia or with any of the gases. There is no need for the use of differential pressure since adhesions are, in most instances, sufficient to fix the lung. In the case of chronic empyema the surgeon may desire the lung, which has been partially collapsed over a long period of time, to be re-expanded. The closed method without intubation is adequate to accomplish this.

Operations for the removal of tumors of the mediastinum and intrathoracic esophageal tumors present the same mechanical difficulties of respiration as total or partial pneumonectomies and are done with the same technique of anesthesia. These patients also receive the preoperative pneumothorax treatment, omitting the broth injection. The possibility of an accidental bilateral pneumothorax is ever present, and if it occurs can be compensated for only by the use of differential pressure. The procedure for pneumonectomy, total or partial, has been discussed.

Thoracoplasties require no special technique of anesthesia. Intravenous, spinal and local anesthesia are used by a few surgeons for these cases. Nitrous oxide, oxygen, or cyclopropane by the closed method, appear to be the popular anesthetics and are the agents of choice in our clinic.

Resection of the vagus nerve in the surgical treatment of asthma does not call for special technique; but because of the position of the patient, who is nearly prone, and the reflex stimulation of the vagus, we have found it exceedingly helpful to do intubatation in these patients.

Anesthesia for operations on the pericardium depends upon the essential principles of intrathoracic anesthesia.

It is of vital importance that differential pressure be readily applicable in all intrathoracic operations. This can be assured only if the anesthesia is maintained by the closed circle, intratracheal technique regardless of the anesthetic agent employed. Extrapleural operations may be safely completed under a wide variety of methods; only in the exceptional case is the intratracheal technique necessary.

Conduct of Anesthesia

No type of surgery demands more diligent attention to detail than does thoracic surgery. Under ideal conditions the anesthetist is cognizant of all the physical findings in the case and has made the acquaintance of the patient. Upon the arrival of the patient in the operating room the blood pressure, pulse, and respirations are recorded. Throughout the operation these are taken and recorded not less often than every five minutes. Any change indicative of impending shock or cardiac failure is immediately reported and measures are taken to combat the condition.

If intratracheal anesthesia is to be established, anesthesia is induced in the usual manner, preferably in an ether room adjoining the operating room. Once intubation has been accomplished, the patient is put into the desired position. Our patients for intrathoracic surgery are put in a modified lateral position with the arm extended above the head and the head of the table elevated approximately thirty degrees. Intravenous therapy, glucose five per cent with saline one and one-half per cent, alternating every 500 cc., is started simultaneously with the operation. Upon completion of the operation the patient is returned to his bed and placed on the affected side, with the head of the bed elevated slightly to allow for the maximum tidal volume of respiration. These patients are not placed in an oxygen tent routinely, but one is always kept in readiness.

We prefer to put in position before anesthesia is begun those patients who are not to have intubation, thus permitting them to adjust themselves to the most comfortable position under the circumstances. While this is the preference, we are guided entirely by the type of patient with which we are dealing. After operation these patients are placed in bed on the affected side.

Postoperative orders are left to change the position every hour from affected side to back; the patient should never lie on the sound side.

In Conclusion I should like to call attention to three points.

Know your surgeon, his preferences, methods, and eccentricities.

Understand the fundamental necessity of individualizing the patient. There is no rule of technique in thoracic surgery; each case presents its own problems.

Appreciate the fact that we are working in a field that is changing from month to month; an open mind and adaptibility are essential to growth.

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AVERTIN AS AN ANESTHETIC IN ORTHOPEDIC SURGERY

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Avertin is the trade name given to a solution of tribromethyl alcohol, a white crystaline substance, in amylene hydrate, in the proportion of two parts to one. It was originated by Willstaetter and Duisberg, and introduced by Eichholtz, in Germany. The earliest record that could be found of its use as an anesthetic agent was on March 27, 1926, at Saint Marienheim, in Elberfeld, Germany, by Hans Killian. Killian states that Eckstein used the drug by mouth for whooping cough and, finding it unpalatable, resorted to rectal administration. By 1929 the use of avertin as an anesthetic in more than one hundred thousand cases had been reported. It was commercially introduced in the United States in 1930, after extensive clinical tests by American physicians. Its use in the series of cases comprising the basis for this report was begun in 1931.

Contraindications

The contraindications of avertin are in large measure those of any general anesthetic. Since these are well known to all anesthetists, they will not be recorded here.

Dosage

When the drug was first used as an anesthetic agent, much larger doses were employed than at the present time. The results of these early experiences doubtless led to the impression, which still exists in the minds of many physicians and anesthetists, concerning the alleged danger of avertin. A perusal of the literature that has accumulated on the subject reveals that the maximum dosage recommended by different users varies from seventy to two hundred milligrams per kilogram of body weight. The dosage used by most anesthetists ranges from seventy to one hundred milligrams per kilogram of body weight, the factors influencing dosage in individual cases being age, obesity, and the presence or absence of such conditions as advanced pulmonary tuberculosis, diseases of the kidneys and liver, acidosis and ulcerative conditions in the rectum and colon. In the more severe forms of these conditions its use may be contraindicated.

Administration

It is the author's invariable practice to administer the anesthetic to the pa-

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tient in bed, since it has been found that moving or otherwise disturbing the patient immediately before beginning the anesthetic prolongs the time required to produce satisfactory anesthesia, and also necessitates the more frequent use of supplementary anesthetics. Moreover, many patients requiring orthopedic operations cannot be moved without pain.

After the dosage to be used is determined, the anesthetic is prepared by adding the required amount of avertin fluid to sufficient distilled water to make a 2.5 per cent solution. The temperature of the water should be about 104 degrees Fahrenheit, since higher temperatures cause a decomposition of the tribromethyl alcohol, with the formation of hydrobromic acid and tribromacetaldehyde, both of which cause severe irritation, or even necrosis of the rectal mucosa. The mixture is shaken until all bubbles cease to rise, and is then tested by adding one drop of a one to one thousand solution of Congo-red to each of two test tubes, one containing five cubic centimeters of the anesthetic fluid, and the other five cubic centimeters of distilled water. An orange-red color is formed, and this should be identical in the two tubes. If a darker color is produced in the tube containing the anesthetic, it should not be used.

The anesthetic is administered by inserting a large catheter, with a small funnel attached to the upper end, three or four inches into the rectum. The fluid is allowed to flow into the bowel slowly, from five to seven minutes being consumed in the process.

Preliminary medication

In most of the reports in the literature on the use of avertin it is stated that some medication, in the form of barbiturates, is employed before the anesthetic is given. Some employ morphine, but a majority who have written on the subject advise against its use, on the grounds of its supposed aggravation of respiratory depression. An enema and a small dose of a barbiturate were given to the patients concerned in this report the night before operation. The barbiturate is repeated once or twice the morning of operation, the last dose being given at least an hour before the anesthetic is administered. In most cases a hypodermic of morphine and atropine was given a half hour before the anesthetic was begun. In patients of advanced age, and in others in whom the margin of safety, for whatever reason, is below normal, the amount of preliminary medication, as well as that of avertin, is reduced.

Supplementary anesthetics

In this series of cases a supplementary anesthetic was found necessary in slightly more than half of the number. The supplementary anesthetic preferred is ether, by the open drop method, because less of this agent is required than of others.

Safety of avertin as an anesthetic

Figures published by different writers during the last three years indicate that the danger of avertin as an anesthetic has been greatly exaggerated. Shipway, in July, 1935, reported the use of avertin in 1600 cases with no deaths attributable to the anesthetic, and stated that avertin is preeminently suitable for patients with hyperthyroidism, diabetes, cardiac diseases, most forms of pulmonary disease, chronic bronchitis and asthma. Mueller, in April, 1936, reported the use of this anesthetic in 3,338 cases, with no anesthetic deaths. Schuman, in January, 1938, analyzed 1,100 cases in which avertin was employed, with two

deaths in which the anesthetic may have played a part. Boyd, in June, 1935, published a survey of 700 cases of avertin used in children. In this group doses of from 175 to 200 milligrams per kilogram of body weight were employed, and there were no deaths traceable to the anesthetic. Bourne, in September, 1936, reported a series of 425 crippled children to whom avertin had been given with no anesthetic deaths. He employed doses from 125 to 200 milligrams per kilogram of body weight. In more than 2000 administrations of avertin by the author, for orthopedic operations on the service of Dr. Charles F. Clayton, there has been one death which was attributed to the anesthetic. This was a patient, aged 73, with a fractured hip, to whom a dose of 100 milligrams per kilogram of body weight was given, following the customary preliminary medication. Since the practice of reducing dosage in advanced age was begun, there have been no deaths, and no instances of serious respiratory depression.

Advantages of avertin as an anesthetic in orthopedic surgery

A large percentage of orthopedic operations are performed on children, and in many of these patients multiple operative procedures are necessary. One of the most terrifying experiences to which the average small child can be subjected is to be held or strapped to a table and rendered unconscious by an inhalation anesthetic, administered through a mask over the face. In cases in which multiple operations are necessary the fears tend to mount with each successive experience. Coe was guilty of no exaggeration when he stated that psychological shock associated with an inhalation anesthetic in a child may well bear a casual relationship to pyschological maladjustments in later life. The ordeal suffered by the patient in such circumstances is little worse than that inflicted on the parents. In the experience of the author in the use of avertin in children, whether one or several anesthetics have been given, there has not been a single instance in which appreciable fright has been caused. In patients to whom more than one anesthetic has been given, instead of fear increasing with each succeeding experience, such fear as may have existed before the first was taken has been entirely absent at the time of succeeding ones. A further advantage possessed by this anesthetic, to which Coe has called attention, is the smoother postoperative course commonly observed in children who approach operation without emotional disturbance. The same advantages may be cited for nervous patients of all ages.

Many patients requiring orthopedic operations cannot be moved from their beds without pain. This experience is avoided by the administration of avertin in bed. In the reduction of many fractures fluoroscopic visualization or x-ray photography are employed. In such cases the use of avertin eliminates the danger of explosion which attaches to most inhalation anesthetics. When avertin is used in the dark room, the anesthetist is not handicapped by lack of illumination.

In all types of surgical cases avertin possesses advantages over other general anesthetics, in that induction is seldom, if ever, attended by disagreeable hallucinations, and that postoperative nausea and vomiting occur infrequently. A further advantage lies in the longer period of narcosis which follows avertin anesthesia. These patients usually fall into a secondary sleep after the initial reaction, this

sleep often lasting for several hours. Pain is absent during this period; hence postoperative medication is materially reduced. Moreover, in the language of Edwards, "the events of the next twenty-four to thirty-six hours will not be remembered, and the whole horrible business of being anesthetized and recovering thus not only diminished in fact but minimized in retrospect."

EVIPAL SOLUBLE FOR THE CONTROL OF CONVULSIONS FROM NOVOCAINE POISONING

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The results of laboratory studies to determine the antidotal value of various drugs for symptoms of poisoning following the use of cocaine as a local anesthetic, were published by Tatum and his collaborators in 1925.[1] Their research proved that the barbiturate sedatives then available had remarkable effect in increasing the minimal lethal dose of cocaine for dogs, and in controlling convulsions resulting from overdosage.

In recent years, the value of the preoperative use of such drugs in increasing the tolerance for local anesthetics of the cocaine-procaine group has been repeatedly emphasized in medical literature by Miller,[2] Waters,[3] Lundy,[4] Maloney,[5] and other well known authorities on anesthesia. The specific anti-spasmodic property of the barbiturates is now noted for the possible event of convulsions developing from individual low tolerance for, or overdosage of, local anesthetics.

Since the subcutaneous use of cocaine has been generally discarded in favor of the less toxic drugs of the procaine group, serious reactions are far less common, despite the modern greatly increased use of local anesthesia. When used in the dilute 0.5 per cent solution, large quantities of the fluid can generally be injected quite safely into the body tissues, as needed for the adequate control of pain during surgical operations. However, toxic symptoms may appear in patients whose tolerance for the drug is low. As described by Maloney,[5] the value of the barbiturates under these circumstances is probably limited to the symptoms arising from overdosage by the relatively slow absorption method from local infiltration of normal tissues. The toxic effects are those of stimulation—apprehension, excitement, increased rate of respiration, and clonic convulsions. If not corrected the condition will progress to respiratory failure and death.

When absorption of the anesthetic is abnormally rapid, due to the injection of the drug into a very vascular area or, accidentally, directly into a vein, the toxic symptoms are sudden onset of acute circulatory depression and failure, with pallor and syncope. Under these circumstances stimulation rather than sedation is indicated.

For the treatment of convulsions, warning is given of the importance of adjusting the dose of the antidote most carefully,[5] as the margin of safety be-

* Read at the sixth annual meeting of the National Association of Nurse Anesthetists, held in Dallas, Texas, September 26-30, 1938.

tween controlling the convulsions, when severe, and stopping just short of respiratory collapse, is very narrow. Moreover Tatum demonstrated that the toxic dose of cocaine from which dogs could recover was inversely proportional to the duration of the convulsions.[1] For these reasons it is evident that a quick-acting barbiturate such as evipal soluble, given by the intermittent method intravenously, and so kept under close control, should be of great value. It can be augmented safely by repeated small doses of a less toxic preparation given intramuscularly, thus combining sensitive control of a convulsive state and more prolonged sedation.

From a rather cursory survey of the recent literature, I have been able to find only one report of the clinical use of evipal soluble for the control of convulsions resulting from a local anesthetic; in this instance the drug was cocaine and the patient an elderly man.[6] I have now to report the effective use of evipal soluble in the case of an infant who developed convulsions from an overdose of novocaine.

The patient, a white male three months old, in fair general condition, was brought to the operating room for repair of a congenital meningocele, involving all of the lumbar vertebrae. During the preparation of the operative site he was crying and very active. Novocaine, 170 cc. of 0.5 per cent solution, with adrenalin, was injected intracutaneously and subcutaneously. Rather suddenly the infant lapsed into a state of unconsciousness with convulsive movements of the head, face and arms developing into generalized clonic convulsions, with moderate cyanosis of the lips and hands.

Treatment: A clear airway was assured and oxygen given continuously. Sodium luminal grain ⅛ was injected intramuscularly, followed by grain 1/16 and grain 1/10 respectively at 15 minute intervals. Convulsions continued. A 5 per cent solution of evipal soluble was then injected very slowly into a vein of the scalp: when 25 milligrams of the drug had been given, the convulsions stopped, and did not recur. The child remained quiet except for more or less continuous movements of his arms, especially when handled for any purpose. Half an hour later he was sleeping quietly. The operation was postponed indefinitely and the patient returned to the ward.

The next day the infant developed symptoms of an acute cold—coryza, sneezing and cough. Fever up to 101 degrees Fahrenheit continued for the next four days, after which the vital signs returned to normal.

Eight days after the first attempt the operation was performed, the meningocele excised and the defect closed. Local anesthesia with a similar solution of novocaine and adrenalin, but far less in quantity, was used. The child withstood the operation very well and the postoperative course, from the surgical standpoint, was smooth. He was discharged "improved" on the seventeenth day postoperative.

Early oxygen therapy is of considerable importance for a convulsive state which interferes with a satisfactory respiratory exchange; this is more effective when oxygen is given by a face inhaler under slight positive pressure. A free airway should be assured by the previous insertion of an oral tube of the tongue depressor type, or, if the teeth are too tightly clenched for this, a rubber tube with several outlet holes inserted through one nostril into the nasopharynx. The addition of carbon dioxide is contraindicated in a condition of temporary acute interference of respiratory exchange which

causes a continuous increase in the alveolar carbon dioxide pressure.

Summary: A brief comment on the antidotal effects of the barbituric acid sedative drugs in relation to local anesthetics is presented, with the report of the control of convulsions, occurring under local anesthesia, in the case of an infant.

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HORACE WELLS DISHONORED IN RENÉ FÜLÖP-MILLER'S BOOK—"TRIUMPH OVER PAIN"

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René Fülöp-Miller, in his otherwise excellent book. "Triumph Over Pain," a story of anesthesia, is inaccurate and incomplete in his description of the life and activities of Horace Wells and his claim of being the discoverer of anesthesia.

Early History of Horace Wells

The early history of Wells is practically ignored except for this incorrect statement on page 107: "On qualifying as a dentist in 1842, Wells entered into partnership with another dental surgeon a little younger than himself, Wm. Thomas Green Morton. Full of hope the two young men opened an office in Boston."

The truth is that Wells studied dentistry with leading dentists during 1834 and 1835 in Boston and started to practice in Hartford, Connecticut, in 1836. [1, 2, 3.] This was six years before 1842 as stated by Fülöp-Miller. In 1841 and 1842 Wm. Thomas Green Morton, who was practicing in a nearby town of Farmington, Connecticut, came frequently to Dr. Horace Wells to recite and obtain assistance in his dental studies. Wells by this time was the head of his profession in Hartford by reason of his "activity, intelligence, inventive genius, mechanical talent and skill." [1]

Estimation of Horace Wells

Fülöp-Miller throughout his book slowly and subtly creates the character of Wells as an intellectually stupid, shiftless, clumsy, morally degraded person by minutely describing the unfortunate, sordid circumstances surrounding Wells' death and with other statements like these: "Having dissolved his partnership with Morton, Wells returned to Hartford. There, too, he made a poor job of it. To be successful, a dentist had to have specialized skill and knowledge which would give him an advantage over his competitors. Wells

lacked these advantages and therefore found it extremely difficult to make a livelihood in Hartford." (page 108)

Compare Fülöp-Miller's evaluation of Wells' skill with this statement by a man who knew him personally: "Wells' ingenuity led him to invent and construct most of his dental instruments, and the dexterity and judgment with which they were used soon made him popular, and he speedily took rank among the first in a city justly celebrated for its skillful dentistry."[1, 2] Now regarding the statement that Wells "found it extremely difficult to make a livelihood in Hartford," his widow writes, "He had a large, extensive, and lucrative practice, which he pursued for several years until he was obliged to abandon it on account of ill health."[1] As to Horace Wells' lack of "knowledge," Fülöp-Miller is inexcusably mistaken. Wells was an exceptionally well educated dentist: "His parents were intelligent, well-to-do and glad to give him every opportunity and advantage. He was sent to a select school until 13 years of age, when he spent a year in a private school under the excellent instruction of Professor Ballard, who entertained a very high opinion of the mental qualities of his scholar. He also attended the academies of Amherst, Massachusetts, and Walpole, New Hampshire."[2] His dental education we have already mentioned, and an indication of his "knowledge" of dentistry can readily be ascertained by studying "An Essay On Teeth; Comprising a Brief Description of Their Formation, Disease and Proper Treatment," written by Horace Wells in 1838.[4] This book not only reveals an excellent knowledge of dentistry but advances several new ideas and theories which indicate superior reasoning ability.

Dental colleges did not exist before 1839, so that it was necessary for an individual desiring to become a dentist to study and work with a practicing dentist. Naturally those men having the best practices were in demand as teachers. Wells was one of these dentists; Morton, as mentioned before, was one of his students as was John M. Riggs who later became a famous dentist.[3] Does the foregoing give the reader the idea that Wells was an ignoramus?

On page 110, Fülöp-Miller states: "The Hartford dentist (Wells) pusillanimously abandoned everything which was not immediately successful." Would a "coward," against the advice of his friends, Riggs and the Chemist, C. Q. Colton, inhale nitrous oxide to the point of insensibility, possibly risking his life, to prove a preconceived idea that here was an agent that would relieve pain during tooth extraction? Would a "weak" man travel all the way to Boston to demonstrate his discovery? Does a study of his life indicate that he was "mean in spirit"? No. On the contrary we read statements like this: "With unusually refined and sensitive feelings and retiring manners, he seldom sought general society. As a citizen, he was a man of great purity of character, and of generous impulses, honoring religion by his walk and conversation; as a son he was kind and dutiful; and in his family relations an example of kindness and affection; in all these respects he was without spot. He was greatly respected in the community where he resided."[1, 2, 3] It appears from this that René Fülöp-Miller or his translators selected an unjust word.

Use of Anesthesia

On page 110 is this statement: "..... he completely forgot his first great ambition, the discovery of a method of

painless extraction," and again on page 130, "'A new era in tooth pulling', Wells exclaimed when making his experiment with laughing gas. But when, subsequently, a public demonstration failed, he abandoned both laughing gas and extraction. That is why, [according to Fülöp-Miller], the new era in tooth extraction did not begin with the Hartford dentist, who was a quitter, but with Wm. Thomas G. Morton." There is readily available abundant unimpeachable evidence to disprove this statement. [1, 2, 7, 8]

Fülöp-Miller, on page 130, says Wells was a "quitter." Dr. C. Q. Colton, the chemist, who gave the exhibition at which Wells conceived his idea, in a pamphlet published in 1866 declares, "That poor Wells failed to convince the world of its value does not militate in the slightest degree against the honor he deserves as the discoverer of anesthesia. He did all a man could do under the circumstances." [9] The literature is full of testimonials showing that Wells still used nitrous oxide and advocated its use until his death. "An Examination of the Question of Anesthesia" by Hon. Truman Smith contains statements from Wells' wife, Doctors Riggs and Terry, who were associated with Wells, and statements from patients and surgeons covering the years from his discovery in December, 1844, until a few days before Wells' death in January, 1848. [7, 6]

How can Fülöp-Miller make such declarations and list Smith's book, referred to above, in his bibliography? Are we to understand that Fülöp-Miller does not believe this testimony set forth by individuals of standing whose honesty has never been questioned? Sir James Y. Simpson said, "His (Wells') affidavits of its (nitrous oxide's) success are unchallengeable."[10]

Discovery of Anesthesia

On page 152, René Fülöp-Miller says, "The discovery of a method for making surgical operations painless was Morton's." Most writers, to avoid making a palpably false statement, would not only carefully weigh all the evidence but also investigate what other individuals or societies had decided. [1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14.] Is it not strange that René Fülöp-Miller studiously avoids mentioning the action taken by the two groups of individuals best qualified to pass on the respective claims of the various contestants, namely, the American Dental Association and the American Medical Association?

The American Dental Association, at its Fourth Annual Meeting at Niagara Falls in 1864 adopted the following resolution: "Whereas . . . Whereas . . . Therefore be it RESOLVED, By the American Dental Association, that to Horace Wells, of Hartford, Connecticut, (now deceased) belongs the credit and honor of the introduction of anesthesia in the United States of America, and we firmly protest against the injustice done to truth and the memory of Dr. Horace Wells, in the effort made during a series of years and especially at the last session of Congress, to award the credit to other persons or person." [11] This resolution was reaffirmed in 1872.[12]

The American Medical Association at its Twenty-first Annual meeting held in Washington, D. C. in 1870, following calm investigation years after the period of controversy, adopted this resolution: "On motion of Dr. H. R. Storer of Massachusetts, it was RESOLVED, that the honor of the discovery of practical anesthesia is due to the late Dr. Horace Wells of Hartford, Connecticut." [13]

Witness too, Fülöp-Miller's partial presentation of Sir James Y. Simpson's

letter (pages 344-345) to Dr. Henry Jacob Bigelow, concerning the controversy over the discovery of anesthesia which raged between these men "until Simpson lay on his death bed" at which time "he penned letters to all his adversaries in which he asked their pardon for such wrongs as he committed."

"One of these letters was addressed to Dr. Bigelow, to whom Simpson felt it needful to make a twofold atonement. Not only, being now face to face with death, did he solemnly declare that he continued to believe chloroform to be a better anesthetic than ether, but he went on to admit frankly that Morton, by his discovery and its application, had initiated 'a new era in anesthetics and surgery.' This letter was published as a pamphlet at Edinburgh under date of April, 1870."

The reader is supposed to understand from these remarks that Sir James Y. Simpson acknowledged Morton as the discoverer. Nothing could be farther from the truth. Read the following quotation from Simpson's letter to Bigelow that Fülöp-Miller very carefully failed to mention:

"A short and adequate experience of a dozen or more cases soon satisfied Dr. Horace Wells and others that teeth could in this way be extracted without pain,...

"During this time also, he seems to have discovered the great point which we now know to be so essential in the successful exhibition of nitrous oxide — namely, that it should be breathed as pure as possible, and without any mixture of atmospheric air.

"Elated with his discovery, he in a week or two proceeded to Boston, in order to lay it before the medical faculty there, and show its effects.

"But now mark what subsequently occurs. An American dentist works out to its practical results the suggestion published in England half-a-century before by Sir Humphry Davy, and which you seem to wish to efface from anesthetic records, and he (Wells) travels a long distance to place the important result before the Medical School at Boston, and some surgeons of the Massachusetts Hospital. There is a slip in the single experiment allowed him. He is spurned and hooted away. In doing this the Medical School of Boston thus delays the whole subject of artificial surgical anesthesia for a couple of years . . .

"The first operations under anesthetic inhalations in America occurred, therefore, as we have seen in the last section, at Hartford, and not at Boston. In Hartford it was effected by an anesthetic gas, long before suggested by Sir Humphry Davy. But at Boston you at first retarded, for a time, the whole progress of anesthesia, by rejecting the evidence of it offered you by Dr. Horace Wells. For, to quote the words of Dr. Riggs, 'there (in your school) he met with a reception so cold that, after a single imperfect trial of the gas, amidst the sneers of those around him, he left Boston in disgust, and sick at heart at the unfair disposition manifested towards him.' "[10]

Fülöp-Miller makes much of Horace Wells' letter of October 20, 1846, to Morton which is printed on page 171 and referred to again on page 175. "Would Wells [Fülöp-Miller asks] have written such a letter if he really believed himself the discoverer?" Wells answered that question in a letter of April, 1847[8] which Fülöp-Miller apparently overlooked:

"The letter which is there introduced with my signature was written

in answer to one which I received from Dr. Morton who represented to me that he had discovered a 'compound,' the effects of which as described by him, entirely eclipsed those produced by nitrous oxide or sulphurate ether, he stating that his compound would invariably produce sound sleep, the length of which was entirely optional with the operator; that he had not made a single failure in one hundred and sixty cases,' etc. He also stated that he had obtained a patent for this compound. I accordingly started for Boston to learn more of this improvement on my discovery, with which I had made him acquainted long before. While at his office, I saw the (so-called) compound administered to a patient; it apparently had the same effect as the gas, which I had many times administered for the same purpose." [5]

No one has ever denied that Horace Wells was the first to "discover, demonstrate and proclaim the blessings of anesthesia"; his opponents merely claimed that he could not be called the "discoverer of anesthesia" because the agent he used, nitrous oxide, was not an anesthetic. "So desirous was Dr. Morton of showing this fact, (that nitrous oxide was not an anesthetic) that on one occasion, when the subject was before a Congressional Committee, and his claim was opposed.... [15] he wrote as follows:

"National Hotel, Washington,
January 18, 1853

"Dear Sir:

The subject of the discovery of anesthesia being now before a committee of which you are chairman, I beg leave to submit to you, and through you to a committee, a proposition.

"One of those who contest my right to the discovery, does so on the ground that anesthesia had been discovered by Dr. Wells prior to my alleged discovery; and that the anesthetic agent used in the discovery by Dr. Wells was nitrous oxide gas. Now, if anesthesia, for surgical purposes, was ever discovered through nitrous oxide gas as the agent, that agent, for the same purposes, will still manifest its efficiency. I deny that such a discovery, by means of said agent, ever was made, or that said agent possesses available anesthetic properties alone for surgical operations. At the same time, I assert and claim that anesthesia was first discovered by me, through the agency of sulphuric ether. Therefore, to prove that nitrous oxide never was discovered to be an available anesthetic agent in surgical operations, and that it is not such now—and to prove also that sulphuric ether was discovered to be an available anesthetic agent for such purposes, and is so now—I propose that an actual demonstration shall be made before the committee of the two agents, in such surgical operation or operations as are considered fair tests by scientific men, at such time as the committee may direct, and patients obtained." [15]

In brief, Morton said that if nitrous oxide was an anesthetic agent, then Horace Wells was the discoverer. Today Wells is recognized by clear thinking, fair minded individuals as the discoverer of modern inhalation anesthesia. To quote further from Nathan P. Rice's book written in 1853: [15]

"The claim of Dr. Wells, however, is not based either by himself, or by his friends after his death, upon a discovery, made by him that ether would produce a complete anesthesia, but that some agent would. To use his own words: 'This discovery does

not consist in the use of any one specific gas or vapor, for anything which will cause a certain degree of nervous excitement, is all that is required to render the system insensible to pain; consequently, the only question to be settled is, which exhilarating agent is least likely to do harm? I have confined myself to the use of nitrous oxide gas, because I became fully satisfied from the first, that it is less injurious to the system than ether.' The same argument is used by Dr. Marcy, who says: 'The man who first discovered the fact that the inhalation of a gaseous substance would render the body insensible to pain, under surgical operations, should be entitled to all the credit or emolument which may accrue from the use of any substances of this nature. This is the principle —this is the fact—this is the discovery. The mere substitution of ether vapor, or any other article, for gas, no more entitles one to the claim of a discovery, than the substitution of coal for wood, in generating steam, would entitle one to be called the discoverer of the powers of steam.'"[15]

With this and the other information mentioned in this criticism readily available, why did Réne Fülöp-Miller withhold it? What purpose would it serve? Did Fülöp-Miller, after his survey, decide that he was better able to judge to whom the honor of being called the "discoverer of anesthesia" should go than Simpson, the American Medical Association, the American Dental Association, and many others? What other reason is there for the suppression of these facts? These facts left out by Fülöp-Miller are most decidedly important ones, much more so than the muckraking Fülöp-Miller indulges in when he minutely describes the sordid, unfortunate details surrounding Wells' suicide. This description early in the book stigmatizes Wells and effectively destroys any admiration which might form in the mind of the uninformed reader. Was this done deliberately?

"Triumph Over Pain" is advertised as "The Story of Anesthesia," then why is not the complete story told? And then, as Horace Wells wrote in 1846, "— — leave it for the public to decide to whom belongs the honor of the discovery."[14]

W. T. G. Morton is honored and revered by the world for his contribution to anesthesia and this criticism is not to be construed as an attempt to detract from the credit due Morton, but is to present information concerning Horace Wells, the present-day acknowledged discoverer of anesthesia,[11, 13] that Fülöp-Miller has intentionally or unintentionally omitted.

Dr. F. H. McMechan, Editor-Secretary General of the International Anesthesia Research, says this: "Like most historical résumés of its kind it continues to repeat the time-worn traditions that have so often been proven false—and printed from author to author without any correction actually being made."

On page 323, Fülöp-Miller states, "Connecticut erected a memorial to Wells, bearing his profile, in Bushnell Park, Hartford, and on December 11, 1937, a carved pew-end as a tribute to Horace Wells was unveiled in the Chapel of Trinity College."

It is strange that Fülöp-Miller should mention this carved pew-end, the latest memorial to Dr. Wells, and completely ignore the address on that occasion by Dr. Walter R. Steiner, a recognized authority on the history of the discovery of anesthesia. Part of Dr. Steiner's speech follows:

"To make a discovery, one must find out or invent something, then demonstrate it and proclaim it to the world; finally he must convince the world of the validity of his discovery. It is because Dr. Wells proclaims his discovery to the world that credit for the discovery of anesthesia must be given to him.

"It is not debatable that Crawford W. Long first used ether in 1842, but he did not proclaim it to the world, which knew nothing of his discovery until 1849. On the other hand, after Wells discovered the principle of anesthesia, he demonstrated it satisfactorily here in Hartford and proclaimed it, so that it was well known in Connecticut and other portions of the United States. Resolutions acknowledging Wells' priority in the discovery came from the Hartford Medical Society in 1859, the Connecticut State Medical Society in 1876, the American Medical Association in 1870, the American Dental Association in 1864, reaffirmed in 1872, the New York State Medical Society in 1860 and the Gynecological Society of Boston in 1870. Although these societies have given him credit for these discoveries, there are, unfortunately, some people who give credit to Dr. William T. G. Morton, who discovered an anesthesia in 1846, two years after Wells had made it known." [16]

In addition to the memorials mentioned by Fülöp-Miller are the following:

MEMORIALS TO WELLS [2]

1. Engraved Silver Plaque. Presented by La Sociedad Odontologica Espanola a Horacio Wells, Madrid 14 Enero 1907, to the city of Hartford, Connecticut, U.S.A. Now in Library of Hartford Medical Society, Hartford, Connecticut.
2. Monument erected by French Dentists, March 27, 1910. Located in Place des Etats Unis, Paris, France.
3. Portrait Statue of Horace Wells given by the Citizens of Hartford, Connecticut, Paul Wayland Bartlett, Sculptor. Located in Bushnell Park, Hartford, Connecticut.
4. Bronze Memorial Tablet, 5' x 29". Attached to building standing on site where Dr. Horace Wells had first nitrous oxide administered to himself. Presented by dentists of America at Fiftieth Anniversary celebration.
5. Cemetery Monument to Horace Wells in Cedar Hill Cemetery, Hartford, Connecticut.
6. Reproduction of a triple painting of the three dramatic events in the life of Dr. Horace Wells. Presented by Prof. Matas Luis Subirani of Madrid, Spain, to Hartford Medical Society, Hunt Memorial Building, 38 Prospect Street, Hartford, Connecticut.
7. Bronze Bust of Horace Wells given by the Dentists of America. Located in the Army Medical Library, 7th and B Streets, S.W., Washington, D. C.
8. Bronze Death Mask of Horace Wells. Located in Boston Medical Library, Boston, Massachusetts.
9. Bust of Horace Wells in official seal of the Hartford Medical Society of Hartford, Connecticut.
10. Memorial Window in memory of Horace Wells, and his wife Elizabeth Wales Wells, in Center Church, Hartford, Connecticut.
11. Replica of Bronze Bust of Horace Wells in the Army Medical Library of Washington placed in the Northwestern Dental School.

12. Carved pew-end as a tribute to Horace Wells. Chapel of Trinity College, unveiled on December 11, 1937.
13. Tablet dedicated to Horace Wells at the seventy-fifth annual session of the American Dental Association in Chicago, August,, 1933, on the occasion of The Century of Progress Exposition. Bronze Tablet now placed in the Hall of Fame, Northwestern Dental School.

(The last three were not in Dr. Chas. J. Wells' list)

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11. Transactions of the American Dental Association, Fourth Annual Meeting held at Niagara Falls, July 26, 1864.
12. Transactions of the American Medical Association, Twenty-first Annual Meeting held in the City of Washington, beginning May 3, 1870.
13. Transactions of the American Dental Association, Eleventh Annual Meeting commencing August 1, 1872, at White Sulphur Springs.
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SUMMARY OF CONVERSATION

Between W. HARRY ARCHER and RENÉ FÜLÖP-MILLER

After lengthy and detailed conversations which took place between the aforementioned gentlemen and supplemented by further conversations with Dr. F. H. McMechan, Secretary General of the International Anesthesia Research Society and Dr. Charles J. Wells, Secretary of the Eastern Society of Anesthetists, regarding the subject of the discovery of anesthesia and the important part that Horace Wells played in the introduction of anesthesia the following was mutually agreed upon.

1. Dr. Archer is thoroughly convinced that the impression he had gained from reading and studying "Triumph Over Pain" that René Fülöp-Miller was in any way intentionally biased in the treatment of Horace Wells is entirely unfounded. The supposed slighting and maligning of Wells was a result of misunderstanding or misinterpretation due to difference in languages. Also there seems to have been a difference of opinion between the author and Dr. Archer as to the importance of certain information which would have reflected credit to Horace Wells.

2. In order to further prove that Mr. Miller is desirous of being unbiased and objective in the entire matter, he is gladly willing to make the fullest use of the convincing material which has been brought to his attention by the gentleman mentioned above. This additional information will be included in any future editions of "Triumph Over Pain" both in English and in foreign languages, and in particular Mr. Miller will suggest the use of said additional information and material in the contemplated motion picture version of "Triumph Over Pain", in order that full justice shall be done to Horace Wells.

3. Copies of this agreement to be sent to

Bobbs-Merrill Publishing Company
Metro Goldwyn Mayer
Officers of the International Anesthesia Research Society and affiliated society officers
Officers of the American Dental Association and affiliated societies
Officers of the American Medical Association and affiliated societies
Horace Wells' Societies
Medical and Dental Editors Associations
and all other interested societies and individuals.

(Signed)—René Fülöp-Miller
W. Harry Archer

New York, October 20, 1938

HOTEL HEADQUARTERS

NATIONAL MEETING, SEPTEMBER 26-29, 1939
HOTEL KING EDWARD, TORONTO, CANADA

SODIUM AMYTAL AND OPEN DRIP ETHER ANESTHESIA IN THYROID SURGERY

LOUIS ESTES WILLIFORD, M.D., F.A.C.S.,*

Houston, Texas

Surgeons throughout the civilized world are arriving rapidly at the definite conclusion that the anesthetist and anesthetics are essential considerations for the successful handling of surgical cases. Were the changes, additions and subtractions to the methods of anesthesia chronologically arranged, they would give a fairly accurate history of the progress of surgery. From the beginning there have been surgeons who were biased in their opinions for or against a certain type of anesthesia which they erroneously tried to make a panesthesia. To those surgeons who have given the proper open-minded consideration to the administration of anesthetics, it is a fairly well established fact that there are certain types of patients whose operative condition is such that they will approach as near as is possible, under the circumstances, the ideal, if the proper care is used in choosing an anesthetic and if the proper premedication is administered. For these reasons we have attempted to suit our anesthetic to the particular patient, considering, of course, the condition for which he is being operated on, rather than attempting to suit the patient to a certain type of anesthesia. Since this has been our policy, we feel that our operative technique has been greatly facilitated, and many of the discouraging and heartbreaking factors have been largely eliminated.

It has been our conclusion, after a number of years of very close observation in which from seventy-five to one hundred and twenty-five goiter patients have been operated on every year, that the goiter patient offers a situation that is markedly different in so far as the anesthetic problem is concerned from that offered by any other type of surgical patient. We have in the goiter case a patient, most often a woman, who has been the rounds of the general practitioners and often the internists. Most of these patients in the early stages are considered to be neurasthenics, neurotics, or patients with glandular deficiency of one kind or another. It is only after symptoms have progressed sufficiently to attract attention to some of the cardinal symptoms of goiter that these patients fall into the hands of those qualified to take care of their situation adequately. By this time they have become extremely nervous, highly irritable, markedly discouraged, and have, to a more or less degree, lost confidence in the medical profession's ability to benefit them. We, therefore, see patients who enter the hospital, usually under protest, or, having reached the end of the road, willing to turn in any direction for relief. These patients are doubtful of any one's ability to help them. They have been told by well meaning neighbors of all the dire things that can come from thyroid surgery, to say nothing of the fear of the operation itself. There is no other operative procedure that we are called upon to carry out that offers so many of these unfortunate

* Read at the sixth annual meeting of the National Association of Nurse Anesthetists, held in Dallas, Texas, September 26-30, 1938.

symptoms as does the operation upon the goiter patient. The surgeon, therefore, is called upon to prepare his goiter patient a greal deal more carefully for surgery than patients for any other surgical procedure.

The patient must have a comfortable night prior to the operation, for if she is allowed to roll and toss all night her heart rate and metabolic processes will be markedly increased, her carbohydrate and fluid balance, which has been so carefully established preoperatively, will be markedly interfered with, and the patient instead of being ready for operation will be progressing towards some degree of thyroid crisis, which might make operation extremely dangerous. The patient must be prepared in such a manner that she can leave her room, and be taken to the operating room either with a sense of security, or in a semi-narcotized condition, so that the fear of operation is minimized. The anesthetic that she receives on the table must be one that will be entirely devoid of all of the disagreeable features of an inhalation anesthetic, since every effort must be exerted to keep from exciting this patient and keep her from going through the excitement stage which is associated with so many of the inhalation anesthetics. There are many goiter surgeons who feel that general anesthesia is the ideal anesthesia. Others use local and regional anesthesia. It is not my purpose to argue the desirability of one or the other of these methods, but only to give my experience with a method by which surgical procedure may be accomplished, with a better protection of the patient against psychic insult, pain and other physiological disturbances.

General Considerations:

Our observations upon the use of sodium amytal (sodium iso amyl-ethyl, barbiturate) anesthesia for major operations extends from the time that an attempt was made to use sodium amytal intravenously alone. It was necessary to give such large doses of sodium amytal that we saw one or two deaths, which, in our opinion, were unquestionably due to the over-toxic effect of large doses of sodium amytal. We then began to experiment with different combinations, such as sodium amytal intravenously, supplemented by nitrous oxide-oxygen, ethylene and oxygen, or open drip ether. Our conclusions were that open drip ether had many advantageous features that the gases did not have, and for the past several years, when general anesthesia was desired for our goiter patients, sodium amytal and open drip ether have been employed as the anesthetic of choice.

Method of Administration:

The anesthetic must be adapted to the patient, and not the patient to the anesthetic; however, we have established a routine method of administration, which we have found to be satisfactory in the large majority of cases—I would say as high as ninety-five per cent of our goiter patients. This consists of the following: The patients are prepared for surgery by the administration of Lugol's solution, high carbohydrate diet, with complete rest in bed, until such time as we feel they have shown sufficient improvement to be good surgical risks. They are then admitted to the hospital, preferably from one to three days prior to the operation, in order to get accustomed to the routine of hospitalization. The immediate preoperative night sodium amytal, grains 3 is given by mouth at 9:00 P.M., 12:00 midnight, and 6:00 A.M. Thirty minutes before the scheduled time of operation, the patient receives morphine grain ⅙, atropin grain $\frac{1}{150}$ by hypodermic. This is sufficient to assure the patient a sound night's

sleep, and places him in a semi-conscious condition, whereby he has no remembrance of leaving his room to go to surgery, and the fear of the operating room is entirely abolished. On arriving at the operating room, care is taken to have the operating room attendants ready to receive the patient, and unusual care is taken to prevent undue noises, which would of course annoy the patient. After being placed on the operating table, the patient immediately receives sodium amytal intravenously in the following manner: 15½ grains of sodium amytal is dissolved in 10 cc. of sterile water. The needle is introduced into a convenient vein, usually in the arm, a very small hypodermic needle being used for this purpose. Sodium amytal is then administered by giving ½ cc. every one-half minute until the patient lapses into a profound sleep. This administration is not done by guess work, but exactly by the clock, and only enough is given to produce a sound sleep, at which time the medication is discontinued.

Open drip ether is then administered in the following manner: The mask is placed over the patient's nose and mouth, the mask being elevated by the anesthetist in such a way as to allow her to place three fingers between the patient's face and the mask. Ether is then dripped onto the mask very slowly for five minutes, at which time one finger is removed from beneath the mask, allowing the mask to be lowered until two fingers remain between the patient's face and the ether mask. The ether is continuously dripped very slowly for another five minutes. During this ten minute period, no towel or other obstruction to air is used around the mask. After the ten minute period has elapsed, the mask is placed directly against the patient's face and the remainder of the mask is covered with a towel. The anesthetic is continued for a minimum of five minutes before the operative procedure is started.

With this routine, it is possible to produce complete surgical anesthesia by the open drip method, without subjecting the patient to any of the disagreeable features of an inhalation anesthetic. Complete surgical anesthesia can be maintained by a continuous very slow drip of the anesthetic solution, less than ¼ pound usually being all that is required for the entire operation.

Dosage and Precautions:

It will be seen from the above described technique that the dose of sodium amytal is not a set amount, but varies with the susceptibility of the patient, not only as to susceptibility of the patient to the drug, but as to any differences in dosage that might exist by virtue of the differences in the size and body weight of the individual patient, since only enough of the anesthetic solution is administered intravenously to produce a sleep sound enough to remove the patient from the disagreeable features of an inhalation anesthetic. The two most usual things that are noted are first, a shallowing of respiration, which does not interfere in any way with the inhalation anesthetic, and secondly, a fall in blood pressure, which varies with the individual patient, but is quickly and adequately taken care of by the hypodermic administration of either adrenalin or ephedrin. The blood pressure is thus quickly brought back to normal, and usually after the surgical procedure is started will remain normal. In our judgment, one of the greatest advantages in the administration of sodium amytal in goiter patients is the fact that the effect of the sodium amytal is sufficiently prolonged to allow the patient

to get rid of the inhalation anesthetic completely before the effect of the sodium amytal has worn off, and completely gets away from the postoperative struggling, nausea and vomiting, that are so often encountered with other forms of anesthesia in goiter patients. We feel that it is absolutely essential to the smooth convalescence of these patients that their period of reacting from the anesthetic be as smooth and as free from struggling and discomfort as was the administration of the anesthetic. This is, in our judgment, most nearly accomplished with the administration of a combination of sodium amytal and open drip ether. If the patient shows signs of becoming unduly restless postoperatively, the administration of a small dose of morphine will give him an additional two or three hours of complete relaxation, so necessary to an uneventful recovery.

Summary:

1. When the foregoing technique is used, the patient is brought to a state of complete surgical anesthesia, without the fear of taking an anesthetic, or of submitting to an operative procedure.

2. If given according to this technique, very slowly and accurately, by the clock, and if only enough is administered to produce sleep, the dose will automatically be varied according to age, weight, condition and other extraneous existing circumstances.

3. Sodium amytal is, in our judgment, best combined with open drip ether, and this combination gives a most satisfactory anesthesia.

4. Postoperative nausea and vomiting are seldom, if ever, seen for the reason that the effect of sodium amytal is sufficiently prolonged to allow the patient to get rid of the ether completely before regaining consciousness.

5. The careful administration of sodium amytal in the foregoing described manner is without danger.

6. This technique affords protection to the patient's psychic welfare—a very important consideration. This is highly appreciated by the patients, all of whom, after having submitted to operation with this method of anesthesia give it loud praise, more especially if they have previously received any other type of inhalation anesthetic.

References:

Goeth Link, M.D. "Sodium Iso Amyl-Ethyl Barbiturate in Goiter Surgery." Anesthesia and Analgesia, January and February, 1930, pages 47-48.

Hill, Jos. A., M.D., F.A.C.S.: "Anesthesia in Goiter Surgery."

NATIONAL CONVENTION
1939

The seventh annual meeting of the National Association of Nurse Anesthetists will be held in conjunction with the American Hospital Association in Toronto, Canada, September 26 to 29, inclusive.

The program is in process of preparation, and suggestions will be greatly appreciated. Any member willing to contribute a paper is asked to communicate with the Executive Secretary, Anna Willenborg, 18 East Division Street, Chicago, Ill.

MASK FOR INHALATION ANESTHESIA WHEN THE WANGENSTEEN TUBE IS EMPLOYED

KATHLEEN STURGEON and F. E. DAVIS, M.D.,
Department of Anesthesia, University of Michigan Hospital
Ann Arbor, Mich.

Since the Wangensteen Suction has come into popular use for draining the stomach during operation, it has caused the anesthetist considerable trouble in the administration of inhalation anesthesia because it has been impossible to obtain a gas-tight application with the Wangensteen tube passing under the mask.

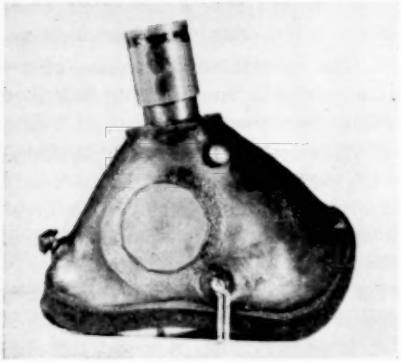


Fig. 1

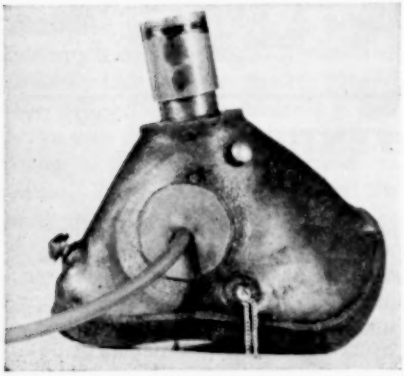


Fig. 2

To obviate this difficulty a Connell mask was used and an opening the size of a ten-cent piece was cut in the right frontal aspect. Over this a diaphragm of very elastic rubber was cemented and a small hole punched through the center of this diaphragm, through which the Wangensteen tube is pulled.

This arrangement allows the mask to fit the face normally and permits adjustment of the tube in the stomach as the operation progresses, without interruption of the anesthesia or loss of the anesthetic mixture. The mask is in no way spoiled for ordinary use, as shown in Fig. 1. Should the tiny opening in the rubber on the side become enlarged and leak, a piece of adhesive may be placed over it.

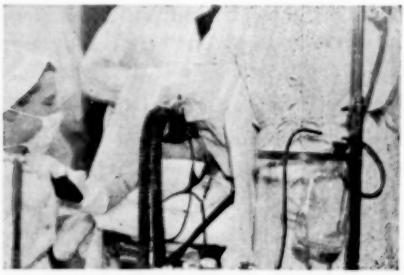


Fig. 3

Fig. 2—Shows the mask with the tube passing through the side opening.

Fig. 3—Shows the mask in use with the tube connected during a gastric resection.

CYCLOPROPANE ANESTHESIA: A SERIES OF 150 CASES

BETTY E. LANK

Chief Anesthetist, The Children's Hospital, Boston, Mass.

One hundred and fifty cases may seem a small number on which to base a report or summary, but because they were in a children's hospital we are of the opinion that such a report may be of value.

We started using cyclopropane in October, 1937, and for some time thereafter it was limited to chest surgery; later we began using it in other fields of surgery, and now the surgeons are asking that it be used in all types of cases.

The following figures give a fairly good idea of our progress in the use of cyclopropane anesthesia for children:

Rib resection	15
Lobectomy	2
Pneumonectomy	2
Excision of mediastinal cyst	2
Closure of esophagus	1
Pericardostomy	3
Ligation patent ductus arteriosus	2
Appendectomy	8
Laparotomy	8
Enterostomy	7
Splenectomy	1
Suprapubic cystotomy	3
Excision patent urachus	1
Urethral dilatation	3
Orthopedic operations	16
Osteomyelitis dressings	15
Inguinal herniorrhaphy	38
Umbilical herniorrhaphy	9
Diaphragmatic herniorrhaphy	2
Epigastric herniorrhaphy	1
Incision and drainage	7
Excision of scars	1
Proctoscopy with excision rectal polyps	1
Excision ganglion of wrist	1
Intravenous injection of varicose veins	1

The children have had a much easier anesthesia and a better postoperative recovery with cyclopropane and the surgeons have felt that some of our sicker children could not have stood an ether anesthesia.

In this group of 150 cases, forty vomited immediately following the removal of the face mask and thirty-six had nausea and vomiting for several hours postoperatively. This is quite a change from a child's having nausea and vomiting for as long as three days postoperatively due to a long ether anesthesia, which delays postoperative recovery. One hundred and twenty cases had morphine for premedication, and we prefer this to be given three-quarters of an hour to one hour before operation. All of our patients had atropine. In nineteen cases it was necessary to add ether for satisfactory relaxation.

Cases	*Ether*
6	5 cc.
5	10 cc.
3	15 cc.
4	20 cc.
1	25 cc.

Twenty-five cases had avertin — 80 milligrams per kilogram of body weight. In the cases in which avertin is not used, morphine is given before the patient leaves the operating table; otherwise extreme restlessness occurs.

There are anesthetists who say that

it is not safe to give nitrous oxide to children under twelve years of age. We do not agree with this and at The Children's Hospital nitrous oxide is given to children fifteen months old and over. So far as cyclopropane is concerned, there is such a vast margin of safety and it is so easily controlled that we have administered it safely to babies only two months old. Our 150 cases include children from two months to twelve years of age.

We use the following technique: All lights that are needed in the operating room are lighted before the administration of cyclopropane is started. The machine tubing and breathing bag are moistened for protection against static electricity. The patient is flushed with oxygen, which takes approximately ten respirations. The oxygen gauge is set at 600 cc. and the cyclopropane is turned on to 300 or 400 cc. for 1½ minutes. When the patient loses consciousness, the head strap is fastened to the mask. The cyclopropane is turned off and the oxygen gauge is set to about 200 cc., or according to the patient's requirement. The filter is then turned on. When this mixture has been well distributed, the cyclopropane is set between 300 and 400 cc. for ½ to 1 minute. This should be sufficient unless there is a leakage or the cyclopropane has diffused through the rubber. If there is a leakage and the pressure in the breathing bag is low, both oxygen and cyclopropane may be added to the original mixture. If cyclopropane alone is turned on to fill the breathing bag, this will make too concentrated a mixture. A sudden rise in pulse and blood pressure denotes a light anesthesia and 15 to 20 seconds of a cyclopropane flow set between 300 and 400 cc. will be adequate to deepen the anesthesia. When the operation is finished, the filter is turned off, the bag is emptied, and the patient is allowed to rebreathe carbon dioxide and oxygen for 1½ to 2 minutes. Usually the patient is conscious before leaving the operating room. Because of the higher metabolic rate and greater rate of respiratory exchange in children we use a larger amount of cyclopropane than for adults, and the same is true with other anesthetics.

The following case may be of interest. A female child, seven months of age, weighing thirteen pounds, entered the hospital in April 1937. Her stay in the hospital was sixteen months, and she was in bed all that time.

Numerous studies were done, and with the aid of fluoroscopy a diagnosis was made of cyst in the right pleural cavity with a question of reduplication of the stomach. In May 1937, an exploratory operation and marsupialization of cyst was done under avertin (80 milligrams per kilogram of body weight) and ether anesthesia. This child had a very bad time under this anesthetic. Fifteen days later an excision of the mediastinal cyst was done under avertin (70 milligrams per kilogram of body weight) and cyclopropane. At the close of this operation the child was in shock. Five days later the surgeon attempted a closure of the esophageal fistula under avertin (60 milligrams per kilogram of body weight) and nitrous oxide and oxygen anesthesia, and the child did well. This closure, however, broke down and one month later a gastrostomy was done for feeding purposes, under avertin (60 milligrams per kilogram of body weight) and nitrous oxide and oxygen anesthesia, and the child did well under this anesthetic also.

After a year's time in which many formulae were tried, and in which there had been frequent spells of elevation of temperature, and breaks in

nutrition with diarrhea and vomiting, the esophageal fistula was closed once more under cyclopropane anesthesia. Both the operation and the anesthesia were successful, but four days later the fistula broke down and fifty-one days after the last operation the child died.

To us this case brings out a very important point, that is, that after fifteen months of complete hospitalization and four previous major operations, we could still go ahead with a fifth major operation, and with the use of cyclopropane have this operation completed. The surgeon and I both feel that this child could not have stood an ether or nitrous oxide anesthesia for the fifth operation.

In this group of 150 cases, we had only three unsatisfactory experiences, and we feel that the difficulty cannot be attributed to cyclopropane.

1. A ten year old child entered the hospital with an acute condition within the abdomen. For premedication atropine, grain $\frac{1}{350}$ was given. The patient was extremely excitable. Sufficient relaxation was not obtained with cyclopropane and we changed to open drop ether which proved satisfactory. The failure to produce satisfactory anesthesia with cyclopropane was due to the excitement and to the fact that the patient did not have the proper premedication.

2. A seven year old child came to the operating room for intravenous injection of varicose veins. For premedication morphine, grain $\frac{1}{24}$, with atropine, grain $\frac{1}{250}$, were given, two hours before the anesthesia was started. Cyclopropane was administered and the child took a smooth anesthesia which lasted 45 minutes. The patient responded immediately after the mask was removed, and started to gag, although there was no vomiting, and then stopped breathing. With the administration of stimulants the patient responded and was sent back to the ward in good condition. We feel the difficulty was due to the fact that the child was in light analgesia, but not past the gagging reflex.

3. A 2½ year old child came to the operating room for a right rib resection. Morphine grain $\frac{1}{48}$ with atropine grain $\frac{1}{400}$ was given forty-five minutes before the anesthesia was started. The child took a smooth anesthesia until the rib was removed, at which time the respirations became slow and shallow, the pulse became very rapid and weak, and there was slight cyanosis. Stimulants were administered and artificial respiration was given. When the patient returned to the ward, he was placed in an oxygen tent for two hours and seemed to be in fair condition. He took fluids at the end of 1½ hours. We feel that the respiratory difficulty was due more to the depth of the anesthesia than to the type of anesthetic.

SUMMARY

For many years it was felt that ether was the safest anesthetic for children, but in our experience with cyclopropane we have found the following advantages, particularly for the very sick child: quiet and rapid induction, easily controlled anesthesia, quiet breathing, less danger of shock, marked decrease in nausea and vomiting, and greater retention of body heat.

STATE ACTIVITIES

COLORADO

The annual meeting of the Colorado Association of Nurse Anesthetists was held November 26th, 1938, at Presbyterian Hospital, Denver, Colo. The constitution and by-laws was presented and adopted, and the following officers were elected for the ensuing year:

President

May Morcom Carpenter,
2370 Ash Street,
Denver, Colo.

Vice-President

Ethel Currie,
Presbyterian Hospital,
Denver, Colo.

Secretary-Treasurer

Louise Bowden,
675 Albion Street,
Denver, Colo.

MICHIGAN

The organization meeting of the Michigan Association was held on Nov. 13, 1937, and on Saturday, Nov. 12, 1938, anesthetists from all over the state gathered at the Lincoln Hotel, Detroit, to review the accomplishments of the year and to bring together again a large group that was unable to attend the annual meeting held last June in Marquette. The meeting was characterized by the same spirit of friendliness and enterprise that was apparent at the organization meeting.

Esther Meil, President of the Association, presided, and a report of activities was given by Ione Wessinger, Secretary-Treasurer. The speakers of the evening were Dr. Myra Babcock of Grace Hospital, Detroit, who gave a comprehensive discussion of the anesthetics of today; and Gertrude L. Fife, of the University Hospitals of Cleveland, who gave a detailed report of the Dallas convention and answered many questions relative to the National organization.

Evalyn Whyte, Charlotte Duggar and Ruth Graff of the University Hospitals of Cleveland were guests at the meeting.

MINNESOTA

The Minnesota Nurse Anesthetists Association has produced another evidence of their sustained enthusiasm and thorough efficiency—a series of State Bulletins issued for the purpose of making closer contacts and keeping the members informed in regard to the activities of the organization. A similar mimeographed pamphlet might well be put out by many other state groups.

The first fall meeting of the Minnesota Association was held at Northwestern Hospital, Minneapolis, on October 25th, 1938, and a full and interesting report of the National convention was given by Hazel Peterson and Rose Littel, who with Mary Risse of Red Wing as driver made the round trip to Dallas by automobile.

At the October meeting the following program of activities was approved and undoubtedly by now is well under way:

1. The establishment of a circulating library. Books and periodicals on anesthesia to be available to out-of-town members upon request; postage paid one way. Communicate with Ruth Walthers, Minneapolis General Hospital, Minneapolis, for books or information in regard to the library.
2. The arrangement of a series of lectures to be given by Dr. Ralph Knight during the winter. For information write Alice L. Anderson, President, Minneapolis General Hospital, Minneapolis, Minn.
3. A bridge party or picture show to be held early in 1939, for the purpose of raising money to meet the 1939 convention expenses.

Through the Minnesota Bulletin the members are urged to make special efforts to attend meetings regularly and to bring in for discussion articles of interest, as well as problems or questions which arise in their daily work. Such activity will assuredly help to achieve the prime objective of the organization—further education and increased efficiency in the work of anesthesia.

Committee Appointments:

Program and Bulletin
Rose Littel, Chairman
Hazel Peterson, Editor of Bulletin
Marie Petrowski
Martha Toomey
Sister Cornelia

Legislation
Maple Baer, Chairman
Janet Kippen
Christine Nickels

Education
Lillian Clayton, Chairman
Nora Swenson
Palma Anderson
Ruth Walthers, Librarian
Pearl Lemke

Social
Elizabeth Gaertner, Chairman
Dorothy Koch
Julia Filla

Membership
Borghild Grebstad, Chairman
Mable Root
Ella Longley
Florence Perkins

OKLAHOMA

The small but active Oklahoma Association held its second annual meeting December 15th and 16th, 1938, at the Biltmore Hotel, Oklahoma City, in conjunction with the Oklahoma Hospital Association.

Miss Martha Puett gave an interesting report of the activities at the National convention in Dallas, followed by a general round table discussion on anesthesia.

The following officers were elected for the coming year:

President
Hellon Gandy,
Wesley Hospital, Oklahoma City

First Vice-President
Martha Puett,
Masonic Hospital, Cushing

Second Vice-President
Mrs. Eula McNiel Parks,
McAlester

Secretary-Treasurer
Julia D. Loftus,
Community Hospital,
Elk City

Trustees:

Two years
Dixie L. Diefenderfer

Three years
Beatrice M. Pitt

VIRGINIA

The annual meeting of the Virginia Nurse Anesthetists Association was marked by interesting and well planned events, the first of which was a trip through the U. S. Navy Yard with tea aboard the U.S.S. "Yorktown"; and a tour of inspection of the Norfolk General Hospital for those who arrived early in the day.

The group assembled for the banquet-meeting in the sumptuous rose-tinted Jefferson Room of the Monticello Hotel in Norfolk, on the evening of December 3rd, where Miss Harriet Ailstock, of Parris Memorial Hospital and Mrs. Lorraine Lewis of the Kings Daughters Hospital of Portsmouth, acted as hostesses.

Interesting and instructive papers were read by Mrs. Lorene Robinson, Stuart Circle Hospital, Richmond, on "Cyclopropane Anesthesia", and Miss Georgia Scott, Lewis-Gale Hospital, Roanoke, on "Comparison of Anesthetics Used in the Shenandoah Valley". A stimulating general discussion was led by Miss Eloise Ward, of Norfolk General Hospital, and a stirring report of the National Meeting held in Dallas was presented by the retiring President, Miss Virginia Godbey, and Miss Ailstock. Miss Inez O'Connor of St. Vincent's Hospital served as Secretary of the meeting, and the following officers were elected for the coming year:

President — Mrs. Minnie Freese Payne,
University of Virginia Hospital, University, Va.

Vice-President — Mrs. Lorene L. Robinson,
Stuart Circle Hospital, Richmond, Va.

Secretary-Treasurer — Carrie V. Mays,
University of Virginia Hospital, University, Va.

Reading Right to Left at the Virginia meeting
Seated: Virginia Godbey, Mrs. Inez O'Conner, Georgia Scott, Elizabeth McGregor, Hazel Hall, Mrs. Julian Doss, Agnes Farrell, Virginia Supinger. Standing: Mrs. Lorene Robinson, Mrs. Lorraine Lewis, Mrs. Eloise Ward, Vera Copeland, Margaret Rudkin, Nancy Forgie, Cora Massie, Harriet Ailstock, Mrs. Geneva Irving.

WISCONSIN

The second annual meeting of the Wisconsin Association of Nurse Anesthetists was held in Milwaukee, November 12, 1938. In the morning a surgical clinic was held at the Milwaukee County General Hospital, at which time Dr. Dricken gave a very interesting tallk on spinal anesthesia.

At 2:00 P.M., at the Hotel Schroeder, the business meeting was called to order by Miss Catherine Cameron, President. It was decided that hereafter two regular meetings will be held in addition to the annual meeting. The group was invited to meet in Wausau in October, 1939.

A very helpful and interesting program was then presented, as follows:

"Future Possibilities of the National Association of Nurse Anesthetists"
Anna Willenborg, Executive Secretary,
National Association of Nurse Anesthetists

"Relation of the Anesthetist to the Hospital and the Surgeon"
Edmund H. Mensing, M.D.

"Postoperative Pulmonary Conditions"
Samuel Rosenthal, M.D.

"Respiratory Effects in the Abdomen"
Dr. Cunningham

A banquet, at which the Reverend T. B. Lyter was the speaker of the evening, was held at the Schroeder Hotel. The group was then entertained by students of the Gellman School of Dancing.

At the business session the following officers were elected for the coming year:

President
Mary A. Yanulis
Municipal Hospital, Beloit

First Vice-President
Ada M. Flasch
St. Mary's Hospital, Milwaukee

Second Vice-President
Mabel E. Johnson
Sheboygan Memorial Hospital, Sheboygan

Secretary
Grace-Mary Craig
324a No. 70th, Wauwatosa

Treasurer
Edna L. Ulbricht
St. Luke's Hospital, Milwaukee

Trustees
Sister Mary Bernadette
Catherine Harkins

MARY ANN YANULIS

COMING MEETINGS

FIFTH ANNUAL CONVENTION

Mid-South Post Graduate Nurse Anesthetists' Assembly

HOTEL PEABODY, MEMPHIS, TENN.

February 15-16, 1939

Wednesday, February 15th

9:00 A.M.
Registration: Hotel Peabody

10:00 A.M.
Invocation: Rev. Girard Lowe, D.D.
Address of Welcome: Henry Hedden, M.D., Superintendent Methodist Hospital, Memphis, Tennessee

10:15 A.M.
Preanesthetic Medication: Rosalie McDonald, Emery University Hospital, Atlanta, Georgia

10:30 A.M.
Difficult Positions: Louise Green Halford, Meharry Medical College, Nashville, Tennessee

10:45 A.M.
The Operative Risk of Patients with Cardiovascular Disease: Neuton S. Stern, M.D., Memphis, Tennessee

11:00 A.M.
The Anesthetist, Anesthetics and Labor: Norris W. Vaux, M.D., Philadelphia, Pennsylvania

11:15 A.M.
Anesthesia in Chest Surgery: Elizabeth N. Wates, Mississippi State Sanatorium, Jackson, Mississippi

11:30 A.M.
Preoperative Care and Anesthesia in Young Children: Edward B. Shaw, M.D., San Francisco, California

12:00 M.
Luncheon

12:45 P.M.
Tennessee State Association: Business Session

2:00 P.M.
Anesthesia in Abdominal Surgery: R. L. Sanders, M.D., Memphis, Tennessee

2:30 P.M.
The Development of a Science of Anesthesia: Ralph M. Waters, M.D., Madison, Wisconsin

3:00 P.M.
Spinal Anesthesia and the Nurse Anesthetist: Morton J. Tendler, M.D., Memphis, Tennessee

3:30 P.M.
Anesthesia in Gynecology: William P. Healy, M.D., New York City

3:45 P.M.
Helium and its Clinical Application: Helen Lamb, Barnes Hospital, St. Louis, Missouri

8:00 P.M.
Banquet, Hotel Peabody

Thursday, February 16th

8:00 A.M.
Intratracheal Demonstration, John Gaston Hospital: Miss Helen Lamb

10:30 A.M.
Dangerous Pain-relieving Drugs: Roy R. Kracke, M.D., Atlanta, Georgia

11:00 A.M.
Individualization in the Choice of an Anesthetic: Alton Ochsner, M.D., New Orleans, Lousiana

11:30 A.M.
"Crawford W. Long": Edgar G. Ballenger, M.D., Atlanta, Georgia

12:00 M.
Luncheon

12:45 P.M.
Mid-South Post Graduate Nurse Anesthetists Assembly Business Session

2:00 P.M.
The Non-Breathing New Born: Evelyn Hurff, Charity Hospital, New Orleans, Louisiana

2:30 P.M.
Obstetrical Anesthesia from the Standpoint of the Anesthetist: M. Pierce Rucker, M.D., Richmond, Virginia

2:45 P.M.
Anesthesia in Brain Surgery: Charlotte Duggar, University Hospitals of Cleveland, Cleveland, Ohio

3:00 P.M.
The Choice of Anesthesia in Gastrointestinal Surgery: Arthur W. Allen, M.D., Boston, Massachusetts

3:30 P.M.
Postoperative Pulmonary Complications: Frederick A. Coller, M.D., Ann Arbor, Michigan

4:30 P.M.
Tea—Marine Hospital

Officers:

President	Mrs. Harriet Hatchett Columbus, Miss.
Vice-Presidents	Mrs. Janie Bramlett, Mississippi Mrs. Martha H. Junkin, Arkansas Mrs. Gertrude Alexander Troster, Tennessee
Executive Chairman	Mrs. Lucy B. Gaffeney
Executive Secretary	Alice Maurine Sims
Chairman Program Committee	Mrs. Jacqueline Kooyman
Chairman Entertainment Committee	Miss Jewelle Fink

FLORIDA

The annual meeting of the Florida Association was held in Orlando on November 12th, 1938. An interesting report of the National meeting held in Dallas was given by Mrs. Mary C. Brown, followed by a round table discussion on anesthesia led by Mrs. Hazel Wells. The Secretary reported a total of twenty-six active and two associate members in the organization.

It was voted to change the time of the annual meeting to April instead of November, and the present officers will serve until the next regular meeting, which will be held in Jacksonville, April 13th to 15th, 1939, in conjunction with the South Eastern Hospital Conference.

NEW YORK

Miss Hazel Blanchard, President, and Miss Cora McKay, Past President of the New York Association, entertained the members of the Capital District at tea at Miss McKay's home, 6 Edison Street, Albany, N. Y., on December 4th. Seventeen of the twenty members of the District were present.

The sixth annual meeting of the New York Association will be held at the Hotel Pennsylvania, New York City, May 17, 18 and 19, 1939, in conjunction with the Hospital Association of the State of New York. The Committee has arranged an interesting program and all anesthetists of neighboring states are cordially invited to attend.

For further information write Miss Dorothy N. Calder, Secretary, Yonkers General Hospital, Yonkers, N. Y.

OHIO

The sixth annual meeting of the Ohio Association of Nurse Anesthetists will be held April 12th and 13th, 1939, at the Deshler-Wallick Hotel, Columbus, Ohio, in conjunction with the Ohio Hospital Association.

For further information write Mrs. Ann Dickerson, Secretary-Treasurer, 1601 Mars Avenue, Lakewood, Ohio.

PENNSYLVANIA

The eighth annual meeting of the Pennsylvania Association of Nurse Anesthetists will be held in Philadelphia in conjunction with the Pennsylvania Hospital Association, on April 26th and 27th, 1939.

For further particulars write Mrs. Helen Young Walker, Secretary-Treasurer, 1824 Wallace St., Philadelphia, Pa., or Miss Nancy Ingram, Chairman Program Committee, Philadelphia General Hospital, Philadelphia, Pa.

TEXAS

The Texas Association will hold its annual meeting April 21st and 22nd, 1939, at the Texas Hotel, Forth Worth, Texas, in conjunction with the Texas Hospital Association. Undoubtedly the impressions left by the National convention held in Dallas last fall will increase the interest taken in the Texas annual meeting this year and a large attendance is anticipated.

For further information write Miss Marcella Ann Cable, Secretary-Treasurer, Hermann Hospital, Houston, Texas.

SAILS FOR CHINA

Miss Myra L. Sawyer sailed on the "S. S. Canada" from Vancouver on January 7th, en route to the New Union University Hospital, West China Medical College, Chengtu, Szechwan, West China. Miss Sawyer has been appointed under the auspices of the Methodist Board of Foreign Missions and expects to act as anesthetist at the Union University Hospital, and also to undertake other responsibilities connected with teaching and supervision.

Miss Sawyer spent twenty-three years as Superintendent of Nurses and chief instructor at the School of Nursing connected with the William Porter Hospital, Tehchow, Shantung, under the Congregational Mission Board. She later took a course in anesthesia at the University Hospitals of Cleveland and was employed at the Waltham Hospital, Waltham, Mass., while waiting for re-appointment to China.

ALUMNAE ASSOCIATION ORGANIZED

The Alumnae Association of the School of Anesthesia of the Jewish Hospital of Philadelphia held its first meeting at the Jewish Hospital, on Tuesday, December 13th, 1938. Meetings are to be held twice yearly—a social gathering in May, and the business meeting in November, at the Jewish Hospital; dues $1.00 per year.

At the organization meeting Dr. Louis Zisserman, Chief of the Anesthesia Department at Jewish Hospital, stated that arrangements are being made for a postgraduate course for alumnae members.

The following officers were elected for the year:

Honorary President	Hilda R. Salomon
President	Alice Smith
Vice-President	Dorothy Wright
Secretary-Treasurer	Bessye Kolker

NATIONAL HEADQUARTERS

18 EAST DIVISION STREET

CHICAGO, ILLINOIS

ANNA WILLENBORG, Executive Secretary

FORM OF BEQUEST OR CONTRIBUTION

In response to inquiries reaching the headquarters of the National Association of Nurse Anesthetists the following form is suggested as a proper one to follow:

"I give, devise and bequeath to the National Association of Nurse Anesthetists' Trust Fund the sum of.....dollars, or property or holdings as follows:

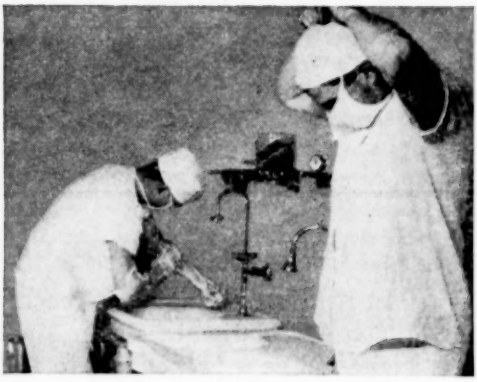
All income from the Fund known as the National Association of Nurse Anesthetists' Trust Fund will be used for the aged and indigent nurse anesthetists who qualify for participation in the benefits of said fund as stated in Trust Fund Document.

Signed.....

(Address in full).....

.....

Date..... .....



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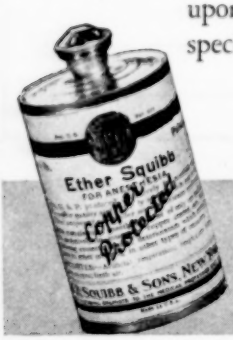

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